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LA-UR--86-3320

DE88 007914

COMPUTER CODES

USED IN

PARTICLE ACCELERATOR DESIGN

by

Los Alamos Accelerator Code Group

AT-6, H829

Los Alamos National Laboratory

Los Alamos, NM 87545

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AT-6:ATN-86-26
FIRST EDITION

LAUR-86-3320
JAN. 1, 1987

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A COMPENDIUM OF COMPUTER CODES USED IN PARTICLE ACCELERATOR DESIGN AND ANALYSIS

by the

Los Alamos Accelerator Code Group

INTRODUCTION

Support for this compilation has been provided by the Offices of High Energy and Nuclear Physics, U.S. Department of Energy. We are extremely grateful for their foresightedness.

In searching the accelerator literature, we have come across only two previous comprehensive surveys of useful accelerator codes. The first was a book by John Colonias, "Particle Accelerator Design: Computer Programs," Academic Press (1974). The second was a review article by Eberhard Keil, "Computer Programs in Accelerator Physics," in "Physics of High Energy Particle Accelerators," (SLAC Summer School, 1982) edited by Melvin Month, American Institute of Physics, AIP Conf. Proc. No.105 (1983). Colonias gives a comprehensive discussion of 35 codes. Keil mentions 21 codes. There are only 3 codes that are mentioned in both surveys. This is perhaps an indication of how rapidly codes become obsolete and new codes are written.

In addition to these surveys, there are four other sources worth mentioning:

1. "Computing in Accelerator Design and Operation, Proceedings of the 1983 Berlin Conference," Springer-Verlag, Berlin, 1984.
2. "Nonlinear Dynamics Aspects of Particle Accelerators, Proceedings of the 1985 Sardinia Conference," Springer-Verlag, Berlin, 1986.
3. "Proceedings of the Workshop on Accelerator Orbit and Particle Tracking Programs," Brookhaven National Laboratory Report BNL-31761.
4. "Workshop on Orbital Dynamics and Applications to Accelerators," March 7-12, 1985 at Lawrence Berkeley Lab, published in Part. Accel. 19(1986)1-262.

In preparing this compilation, we came across the names of more than 150 programs that have been used in the design and analysis of accelerators. Many are obsolete and some are not easily transported from the institution where they were created. All are included in this compilation for completeness. Codes known to be obsolete are so labeled. Beyond that, we have not made any critical evaluations of these codes.

Computer codes and code compilations share the common problem of obsolescence. This compilation will probably be almost useless in three years or less. Useful codes become widely distributed. Users make improvements in distributed code and the original author loses control over the evolution of the code as variations proliferate. Many times authors tire of maintaining, documenting, and distributing their codes. Every generation of accelerator physicists produces code builders, persons who feel that they can design more comprehensive or easier to use codes to do the tasks done by previous codes.

On the whole this environment of change is healthy, but when the number of codes and the variations on the same code become too large, there is a legitimate concern about duplication of effort and confusion in comparing the outputs of different codes that supposedly do nearly the same calculations.

It might be useful to establish a mechanism for evaluating and making comparisons between codes. Such a mechanism would also be useful in maintaining and guiding the evolution of codes abandoned by the original authors and in setting standards for types of input, output, and documentaton.

The design of the next generation of high-energy accelerators will probably be done as an international collaborative effort and it would make sense to establish, either formally or informally, an international center for accelerator codes with branches for maintenance, distribution, and consultation at strategically located accelerator centers around the world.

This arrangement could have at least three beneficial effects. It would cut down duplication of effort, provide long-term support for the best codes, and provide a stimulating atmosphere for the evolution of new codes. It does not take much foresight to see that the natural evolution of accelerator design codes is toward the development of so-called Expert Systems, sy tems capable of taking design specifications of future accelerators and producing specifications for optimized magnetic transport and acceleration components, making a layout, and giving a fairly impartial cost estimate. Such an expert program would use present-day programs such as TRANSPORT, POISSON, and SUPERFISH as tools in the optimization process. Such a program would also serve to codify the experience of two generations of accelerator designers before it is lost as these designers reach retirement age.

It is our hope that this compilation will stimulate some thought in this direction. This compilation was assembled by first sending a questionnaire to everyone that we could find who had written a code that might be useful in accelerator design and analysis. About one-third of the questionnaires were returned. We then set about searching the literature for descriptions of the remaining codes. We also telephoned authors when we could not get sufficient information from the literature. Certainly there are useful codes that we did not find. We solicit the readers of this document to write to us about our omissions as well as any errors in content. We are planning to update this document at least once.

This documem is organized so that each code is described on a one- or two-page data sheet. The data sheets are arranged alphabetically by code name but are not numbered. In this way, it will be easy to insert new codes as they are discovered. There are a number of simulation codes that have no names, and we have not taken the time to obtain detailed information on all of them. However, there are two fairly current codes that we thought worthwhile to include here. Therefore we have arbitrarily assigned them names. One of these is a CERN code by Myers, which we have called BEAMBEAM and the other is a DESY code by Piwinski, which we have called BMBMI.

The code data sheets are preceded by three indexes: 1. subject, 2. person-to-contact, and 3. code acronym. It was not useful to list codes by authors because, in many cases, the original author is no longer associated with the code and many other persons have contributed to maintaining and improving the code.

We would like to thank those who replied to our request for information. Special thanks goes to Roger Peng, who did most of the organization and typing, and to Gary Benson, who wrote the TEX-formatting macro for the data sheets.

It is our sincere hope that this document will be helpful to persons entering the accelerator field. It has certainly been a revelation to us.

John L. Warren

SUBJECT INDEX

COMPONENTS-Magnets
- CARMEN
- DE2D
- DIFDIRA
- EDDYNET
- EFFI(3D)
- EMD
- FATIMA
- FORGY (See TRIM)
- GFUN3D
- LINDA
- MADEST
- MAFCO
- MAFCO-W
- MAGFOR
- MAGNET
- MAGNUS
- PANDIRA GROUP CODES
- PAR2DOPT
- PE2D
- POISCR
- POISSON GROUP CODES
- POISSON-BNL
- POISSON-LBL
- POISSON-TAC
- PROFI
- SATDSK
- TOSCA
- TRIDIF
- TRIM(ANL)

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- MESSYMESH
- MULTIMODE
- OSCAR2D
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- PRUD-M
- PRUD-O
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- (BMBMI)
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- LIEPOT
- LILA
- LIMATRA
- MAFCO III
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- MIRKO
- PATPET
- PATRAC
- PATRICIA
- PATTV
- PETROC

PETROS
RACETRACK
RING
SCOP-2
SCOP-RZ
SIMTRAC
SLIM
SYNCH
TEAPOT

SIMULATION/TRACKING-Spectrometers
BEAMTRACE
PINWHEEL
TRACK

SIMULATION/TRACKING-Storage Rings
DIMAD
LATTICE
MARYLIE
SCOP-2
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SYNCH

SIMULATION/TRACKING-Transport and Beam Lines
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MOTION
REVMOC
SPEAM VI
TRAMP
TRANCO
TRANSPORT
TRANSPORT_LBL
TRIO
TURTLE

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GOC3D (General Magnetic Field)
KOBRA (Space Charge Effects)
MAFCO III (General Field Configurations)
MISAR (Intense Beam Accumulator Rings)
OPTIC II (Electrostatic Accelerators)
SINAC (General Magnets)
SOTRM (Generate Transport Matrices from Magnetic Field)

OTHER APPLICATIONS-
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GIANT (Control Program)
GO (Executive Program)
GRAPHIC (Executive Program)
HETC (Target and Shielding Design)
HOPI (Control)
ISIS (Modeling of Intense Charged Particle Beams)
ITS (Charged Particle Transport Code)
MARTUR (Radiation Loading Calculation)
MEBT (Beam Diagnostics)
SOTRM (Generate Transport Matrices from Magnetic Field)
TRANCO (Control)
WAVE (Laser Beat Wave Acceleration)
WIGWAM (Electron Storage Ring and Wiggler Performance)

PERSON-TO-CONTACT INDEX

Dragt, Alex J.
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Edwards, T. W.
MESSYMESH
Fan Mingwu
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Fedoseyev, A. I.
MULTIMODE
Fernandes, P.
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MAPPOT
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Gardner, J. W.
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Gluckstern, Robert
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Gupta, R. C.
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Gygi, Monica
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Halbleib, J. A.
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Hara, Masahiro
HAX
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Hayden, R. J.
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Heighway, Edward A.
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Hofmann, Ingo
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Herrmannsfeldt, W. B.
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Hilaire, A.
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Hodgdon, M. L.
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Jones, Michael E.
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Jowett, John M.
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Keil, E.
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KN7C
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SYNCH
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Kost, Corrie
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SPEAM VI
Kowalski, Stanly
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Lari, Robert J.
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FORGY (See TRIM)
TRACK
TRIM
Le Maire, J. L.
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Los Alamos Accelerator Code Group
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PARMILA
PARMTEQ
PANDIRA GROUP CODES
PATH
POISSON GROUP CODES
RAYTRACE
SUPERFISH GROUP CODES
TRACE
TRACE3D
ULTRAFISH
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BEDLAM
RFQLIB
Marti, Yolande
MICADO
PETROC

Matsuo, T.
TRIO
MacRoberts, M. D. J.
CURE
McNeilly, G. S.
SATDSK
Morgan, Gerry
PAR2DOPT
Mottershead, C. T.
MEBT
Myers, Steve
(BEAMBEAM)
Niederer, Jim
LILA
Opp, Eric N.
DISPERSION
Paul, Arthur C.
EBQ
GOC3D
TRAJECTORY
TRANSPORT (LBL version)
Peggs, Steve
EVOL
Pissanetzky, Sergio
MAGNUS
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Piwinski, A.
(BMBMI)
Prael, Richard E.
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PROFI Engineering
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Rudolf, Gerhard
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Ryne, Robert
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Sackett, S. J.
AZTEC
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JASON
MAFCO III
Sauret, J.
NAJO
Sawyer, C.
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Schmidt, W.
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Schriber, S. O.
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Servranckx, R.
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von Holtley, G.
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Warren, John L.
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Wiedemann, H.
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Weiland, Thomas
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MAFIA
TBCI
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Whitney, John S.
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PE2D
TOSCA
Wilhelm, Wolfgang
CAV3D
CAVIT
Wollnik, H.
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COSY 5.0
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RACETRACK
Yang, T. F.
MAFCO-W
Young, Lloyd M.
PARMELA
Zisman, Michael S.
ZAP
Zotter, B.
BBI

LIST OF CODES

AGS
ALIGN
ARCHSIM
AXCEL-GSI
AZTEC
BBI
BCI
BEAM
(BEAMBEAM)
BEAMTRACE
BEDLAM
BIM2D
(BMBMI)
CARMEN
CAV3D & CAVIT
CCRTRACE
CODINV
COMFORT
COSY 5.0
CURE
DECAY-TURTLE
DE2D
DIFDIRA
DIMAD
DISPERSION
EBQ
EDDYNET
EFFI(3D)
EGUN
EMD
EVOL
FATIMA
FORGY (see TRIM & FORGY)
GENMAP 3.0
GFUN-3D
GIANT
GIOS
GO
GOBLIN
GOC3D
GRAPHIC
HARMON
HAX
H2DB
HETC
HOPI
ISIS
ITS (INTEGRATED TIGER SERIES)
JASON
KN7C
KOBRA
LACC
LALA
LALAGE

LANS
LATTICE
LIEPOT
LILA
LIMATRA
LINDA
LOOPER
LTRACK
MAD
MADEST
MAFCO
MAFCO III
MAFCO-W
MAFIA
MAGFOR
MAGNET
MAGNUS
MAPPOT
MARTUR
MARYLIE
MASK
MATRACE
MEBT
MESSYMESH
MICADO
MIRKO
MISAR
MOTER
MOTION
MULTIMODE
NAJO
OPTIC II
OSCAR2D
PANDIRA
PAQUASEX
PAR2DOPT
PARMELA
PARMILA
PARMTEQ
PATH
PATPET
PATRAC
PATRICIA
PATTV
PETROC
PETROS
PE2D
PINWHEEL
PISCES
POISCR
POISSON GROUP CODES
POISSON-BNL
POISSON-LBL
POISSON-TAC
PROFI

PRUD-M
PRUD-O
PRUD-OB
RACETRACK
RAY
RAYTRACE
RELAX3D
REVMOC
RFQLIB
RING
RMKT
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SCHAR
SCOP-2
SCOP-RZ
SHRIMP
SIMTRAC
SINAC
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SPEAM VI
SUPERFISH GROUP CODES
SYMP3
SYNCH
TBCI
TEAPOT
TOSCA
TRACE
TRACE3D
TRACK
TRAJECTORY
TRAMP
TRANCO
TRANSOPTR
TRANSPORT
TRANSPORT-LBL
TRANSVRS
TRIDIF
TRIM (ANL) & FORGY
TRIO
TURTLE
ULTRAFISH
URMEL
URMEL-T
WAVE
WIGWAM
WOLF
ZAP
ZFIELD

Date of Latest Version: unknown

Program Name: AGS

Person to Contact: E. Keil
Address: LEP Division
CERN
1211 Geneva 23
Suisse, Switzerland

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program AGS computes the transformation matrices of the elements that make up the synchrotron, computes the betatron and closed orbit functions, the coordinates of the equilibrium orbit, and other pertinent quantities. A typical run is completed in less than one minute. Memory requirements depend on the number of elements that the program can handle. For maximum efficiency the program is overlaid and more than 1500 elements can be accommodated in less than $50K_8$ memory locations. Program AGS is, in many respects, similar to program SYNCH.

Publications describing the code:

E. Keil, Y. Marti, B. W. Montague and A. Sudboe, "AGS - The ISR Computer Program for Synchrotron Design, Orbit Analysis and Function Matching" CERN Internal Report CERN 75-13(1975).

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

No longer supported by the authors.

Source language: FORTRAN

Computers it runs on: CDC 6600

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address: keil@cernvm

Date of Latest Version: unknown

Program Name: ALIGN

Person to Contact: Elon R. Close MS-50B/2239
Address: Lawrence Berkeley Laboratory
1 Cyclotron Rd.
Berkeley, CA 94720
USA

Telephone Number: (415) 486-6166, FTS 451 6166

Classification of Computer Code:

Component Design:

☐ Ion Source, ☐ Magnet, ☐ RF--cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:

☐ Stability, ☐ Impedances, ☒ Closed Orbit Correction.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This code simulates survey misalignments of magnetic elements in a circular accelerator. It constructs a closed orbit corresponding to the misalignment errors and finds corrector strengths needed to sustain particle beam within the vacuum chamber. This is a Monte Carlo type program that performs a collection of misalignments over an ensemble of machines. ALIGN was developed and used for the construction of PEP, has been exported to CERN where it was used in the design of LEP.

Publications describing the code:

E. Close, et al, "Proposed Orbit and Vertical Dispersion Correction System for PEP," Stanford Linear Accelerator internal report PEP Note 271 and CONF-7903271-151 (1979).

Is code documentation available? ☐ Yes ☒ No

How may the code be obtained?

Call Elon R. Close.

Source language: FORTRAN

Computers it runs on: CDC

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks

Tape format:

Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: July 1986

Program Name: ARCHSIM

Person to Contact: Henry A. Thiessen
Address: MP-14, MS H847
Los Alamos National Lab.,
Los Alamos, NM 87545
USA

Telephone Number: (505)667-8991, FTS 843-8991

Classification of Computer Code:

Component Design:

☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☐

Analysis:

☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ARCHSIM simulates the acceleration cycle of a rapid-cycling proton synchrotron. A lattice can consist of up to 100 cells and rf cavities. Transport of the beam in six dimensions includes all second-order optical terms. The rf field and proton velocity are treated exactly. Longitudinal space charge is handled in a self-consistent manner. The fluctuations due to the finite number of particles are handled by a Gaussian smoothing algorithm. The program runs on a VAX 11/780 and can track 100 particles without space charge through the full acceleration cycle from 0.8 to 32 GeV in 49 minutes ($\sim$ 5000 turns). A thousand particles with space charge takes about ten hours of computer time.

The motivation for writing this tracking program was the need to explore the effect of various rf accelerator-cavity parameters on the beam dynamics and stability of a proposed 32-GeV rapid-cycling synchrotron.

Currently the program is under revision to improve the graphics (phase space plots and particle distribution histograms), and the number and type of optical elements available. The program uses second order transport matrices generated by another program like DIMAT. These matrices are checked to see if they are symplectic before doing the simulation.

Publications describing the code:

Henry A. Thiessen and John L. Warren, "ARCHSIM: A Proton Synchrotron Tracking Program Including Longitudinal Space Charge," Computing in Accelerator Design and Operation, Proc., Berlin 1983, Springer-Verlag Berlin (1984) 225–60.

Is code documentation available? ☐ Yes ☒ No

How may the code be obtained?

Contact H. A. Thiessen.

Source language: FORTRAN

Computers it runs on: VAX 11/780

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☒ Networks
Tape format: 9 Track 1600 bpi
Diskette size & format:

Available through: ☐ DECNET, ☒ ARPANET, ☒ BITNET
☐

Network Address: hks@lanl.arpa

Date of Latest Version: 1986 Program Name: AXCEL-GSI

Person to Contact: P. Spädtke
Address: GSI-Darmstadt
Postfach 11 05 41
6100-Darmstadt
Fed. Rep. Germany

Telephone Number: 6151 359 323

Classification of Computer Code:

Component Design:

[x] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Electron Gun/DC-Beam Transport

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

2D-code, cylinder symmetry, plasma boundary, electrons and ions, cathode simulation/plasma simulation, including symmetric magnetic fields(!). Interactive code. Diagnostic: trajectories, emittances, transverse energies ...

Publications describing the code:

Peter Spädtke, "Computer Simulation of High Current DC-Ion Beams," Proc. 1984 Linac Accelerator Conf. Seeheim May 7-11, 1984, GSI, Darmstadt internal report GSI 84-11.

J. Klabunde, P. Spädtke, and A. Schönlein, "High Current Beam Transport Experiments At GSI", IEEE Trans. NS-32 (1985) 2462.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Peter Spädtke.

Source language: Fortran 77

Computers it runs on: IBM VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address: d13ddvax.gsi.bitnet

Date of Latest Version: 1972 Program Name: AZTEC

Person to Contact: S. J. Sackett, MS L-122
Address: Applied Mechanics Group
Lawrence Livermore Laboratory
Box 808
Livermore, CA 94550
USA
Telephone Number: (415) 422 8709, FTS 532 8709

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[x] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

AZTEC calculates the fields due to an azimuthally bunched beam in cylindrically symmetric structures of arbitrary geometry. The computed fields are then used to calculate the self-impedance of the beam for stability studies. Any combination of dielectric, magnetic, and conducting materials is allowed. Material properties, however, are assumed to be isotropic and linear. Boundaries between different materials within the problem space may be arbitrary curves, as may the contour defining the beam region.

Publications describing the code:

S. T. Sackett and A. A. Garren, "AZTEC — A Code for Calculating the Impedance of an Azimuthally Bunched Beam in a Cylindrically Symmetric Structure," Lawrence Berkeley Laboratory Internal Report LBL-774(1972).

John S. Colonias, "Particle Accelerator Design: Computer Programs," Academic Press, New York (1974) 281.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

No longer supported by the authors

Source language: FORTRAN & Compass

Computers it runs on: CDC 7600

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: June 1984 Program Name: BBI

Person to Contact: Mme. Monica Gygi. B. Zotter
Address: CERN
LEP Theory Div.
1211 Geneva 23
Switzerland

Telephone Number: 83 2951-83 6637

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[x] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Calculation of bunched beam instabilities:

Longitudinal transverse coupled bunch modes.

Bunch lengthening, transverse mode coupling.

Tune Shifts, intra beam scattering etc.

Publications describing the code:

Internal CERN Report, LEP Theory Note 83-2

Albert Hofmann, Kurt Hübner and Bruno Zotter, "A Computer Code For The Calculation Of Beam Stability In Circular Electron Machines," IEEE Trans. NS 26 (1979) 3511

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Source language: FORTRAN

Computers it runs on: CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET

Network Address:

Date of Latest Version: Unknown

Program Name: BCI

Person to Contact: Thomas Weiland
Address: DESY
Group MPY
Notkestrasse 85
2000 Hamburg 52
Fed. Rep. Germany
Telephone Number: 49 40 8998 3196

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [x] Beam cavity interactions

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The electromagnetic fields excited by arbitrarily shaped bunches of charged particles travelling through accelerating structures with cylindrical symmetry are calculated by a numerical method solving Maxwell's integral equations in the time domain. The computer program based on this method calculates transient electromagnetic fields as well as the total energy radiated and the energy gain of particles inside the bunch. The shape of the accelerating structure may be defined by the user and can be approximated in a mesh of up to 50,000 nodes. This code has been superseded by TBCI.

Publications describing the code:

T. Weiland, "Transient Electromagnetic Fields Excited by Bunches of Charged Particles in Cavities of Arbitrary Shape", Proc. of XI Int'l. Conf. on High Energy Accelerators, Geneva (1980) 570.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

This code has been replaced by TBCI.

Source language: FORTRAN

Computers it runs on: CDC, IBM

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1985 Program Name: BEAM

Person to Contact: Murray Shubaly
Address: Group AT-1, MS H817
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 9124, FTS 843 9124

Classification of Computer Code:
Component Design:
[x] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

BEAM (Beam Extraction and Acceleration Modeling) is a second generation 2D ion source code based on AXCEL with some features from SNOW. It has the following capabilities: Starting from the unperturbed plasma, the code calculates ion trajectories and electrostatic potentials, the electrode boundaries need not coincide with mesh lines, the mesh density is variable to permit finer resolution in critical regions. Both extraction and injection calculations are possible, with variable current density in the source plasma, variable ion injection energy and angle, and finite ion temperature effects. Space charge neutralization is included. The output of the code gives values of rms emittance, divergence and radius, maximum divergence and radius, and overlaid equipotential and trajectory plots. Both rectangular and cylindrical geometry are treated. It does not at present handle axial magnetic fields, but this improvement is planned in the near future. Only partially complete documentation is available, but the coding is well commented.

Publications describing the code:

M. R. Shubaly, R. A. Judd and R. W. Hamm, "BEAM, An Improved Beam Extraction and Acceleration Modeling Code," IEEE Trans. NS 28 (1981) 2655.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Call Murray Shubaly or The Los Alamos Accelerator Code Group (505) 667 6077 or 667 2830.

Source language: FORTRAN IV

Computers it runs on: CDC 7600, CYBER 175, VAX, IBM.

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 1600 bpi, 9 track
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hksc@lanl.arpa

Date of Latest Version: unknown

Program Name: (BEAMBEAM)

Person to Contact: Steve Myers
Address: CERN
LEP-Divsion
1211 Geneva 23
Switzerland

Telephone Number:

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Colliding Beams.

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A multi-particle two-beam (strong-strong) simulation program has been written for investigation of the beam-beam effect in 'LEP'. The motion of the superparticles is treated in six-dimensional phase space and the effects of quantum excitation and radiation damping are included. The effects of perturbations to the superperiodicity (errors) are also included. Non-zero dispersion at the RF cavities allows computation of single beam synchro-betatron resonances.

After each revolution the parameters influencing the beam-beam force (e.g. the beam dimensions and the beam current) are recvaluated in order to simulate a real situation. For the beam-beam force an elliptical beam with Gaussian charge distribution has been assumed. The computation of this force is speeded up by using tabulated values of the complex error function and a fast interpolation procedure.

The initial distribution of a large number of particles (typically 200) in the three phase planes are random with pre-specified variances. Each particle in each beam is 'tracked' through (i) an RF cavity, (ii) a beam-beam interaction and (iii) a traversal of a machine arc. This procedure is repeated until each beam has completed one run. The position of each particle is then compared with aperture limitations (typically 10 σ) and those particles which fall outside are excluded from further tracking. The remaining particles are then used to recalculate the beam current, the specific luminosity, the beam variances and hence the new beam beam kick parameters. This cycle is repeated until the 'beam' has been circulating for about 1.5 damping times.

Publications describing the code:

S. Myers, "Beam Beam Simulation for LEP," IEEE Trans NS 28 (1981) 2503. (See also IEEE Trans NS 30 (1983) 2466, and Nucl. Insts. Meth. 211 (1983) 203.)

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1985

Program Name: BEAMTRACE

Person to Contact: M. Berz or H. Wollnik
Address: II. Physikal Institut
Heinrich Buffring 14-16
6300 Giessen,
Fed. Rep. Germany

Telephone Number: 641 702 2770

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [x] Cyclotron, [x] Synchrotron, [x] magnetic optical system

Tracking or Simulation:
[ ] Linac, [x] Cyclotron, [ ] Synchrotron, [x] mass spectrometers

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PIC-code, usual beam elements, space charge, transport beam by 2nd order matrices.

Publications describing the code:

H. Wollnik, J. Brezina and M. Berz, "GIOS-Beam Trace, a program for the design of high resolution mass spectrometer", 2nd Intl. Conf. on Charg. Particle Optics, Albuquerque, May 19-23, 1980. (To be published in Nucl. Inst. Meth.).

GSI report THD 26, Darmstadt (1984).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Source language: FORTRAN

Computers it runs on: VAX, Cyber

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [x] Diskette, [ ] Cards, [x] Networks
Tape format: as desired
Diskette size & format: as desired

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: ug21%ddhgsi30bitnet

Date of Latest Version: Aug. 1985 Program Name: BEDLAM

Person to Contact: Walter P. Lysenko
Address: Group AT-6, MS H829
Los Alamos National Laboratory
Los Alamos, NM 87545

Telephone Number: (505) 667-7431, FTS 843-7431

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

BEDLAM is a fourth-order moment simulation code. The beam at the input to a linear accelerator is specified as a collection of moments of the phase-space distribution. Then the moment equations, which describe the time evolution of the moments, are numerically integrated. No particles are traced in this approach. The computed distribution and the external forces are computed consistently to a given order of accuracy. Although BEDLAM includes moments to fourth order only, it could be systematically extended to any order. Another feature of this method is that physically interesting and intuitive quantities, such as beam sizes and rms emittances, are computed directly. This code is still under development to include space charge effects.

Publications describing the code:

P. J. Channell, L. M. Healy and W.P. Lysenko, "The Moment Code BEDLAM," IEEE Trans. NS-32 (1985) 2565.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Los Alamos Accelerator Code Group, (505) 667-6077 or 667-2839.

Source language: FORTRAN

Computers it runs on: CRAY, SUN

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: whatever
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: lks@lanl.arpa

Date of Latest Version: Dec. 1984 Program Name: BIM2D

Person to Contact: John S. Whitney
Address: Vector Fields, Ltd.
Osney Mead
Oxford OX2 OEE
England

Telephone Number: 0865 248236

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [x] General purpose magnetic field calculation in 2D

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

BIM2D is an interactive computer program for solving linear magnetostatic problems using boundary integral methods.

The computer model assumes that the magnet can be represented by a two-dimensional (x-y) cross-section of iron and conductor regions. The permeability in each iron region and the current density in each conductor region are specified constants which can be changed between repeated analyses. The limitation to fixed permeability allows an integral formulation where only the edges of the iron cross-section need to be meshed; the analysis is performed very quickly on-line so that the system is truly interactive.

Input to the program is via a graphics terminal and is completely interactive. As the magnet data are input, the model is displayed on the terminal screen. Any errors can be seen and corrected immediately.

Magnetic fields can be calculated at points, along a line or over a grid, displayed as contour maps or graphs and consequent forces can be obtained. Listings, graphs and plots are available as output.

Publications describing the code:

Rutherford Report RL 79 088(1979)

Data Sheet Ref: 028631

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

By license agreement with Vector Fields Ltd

Source language: FORTRAN 77

Computers it runs on: PRIME, VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: As required
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: (BMBMI)

Person to Contact: A. Piwinski
Address: DESY
Notkestrasse 85
2000 Hamburg 52
Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Colliding Beams

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The beam-beam interaction was simulated on a digital computer taking into account the horizontal and vertical betatron oscillation, the synchrotron oscillation, a horizontal dispersion at the interaction point, quantum fluctuation, damping and the exponential decay of the voltage at the separators. The space charge forces were derived from the exact potential of a time-independent gaussian bunch, were calculated for 10000 points and then quadratically interpolated for each passage. The simulation was done for 225 particles starting with a gaussian distribution. The beam height and the beam width were calculated as the root mean square of the coordinates of the particles at the interaction point during 20 revolutions. The collision of two strong bunches was also simulated.

Publications describing the code:

A. Piwinski, "Computer Simulation of the Beam-Beam Interaction," 11th Int'l Conf. on High Energy Accelerators, Geneva, July 7–11, 1980, Berkhäuser Verlag, Basel.

A. Piwinski, "Computer Simulation of the Beam-Beam Interaction at a Crossing Angle," IEEE Trans. NS-32 (1985) 2240.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Version 1.0, 1986

Program Name: CARMEN

Person to Contact: John S. Whitney
Address: Vector Fields, Ltd.
Osney Mead
Oxford OX2 OEE
England

Telephone Number: 0865 248236

Classification of Computer Code:

Component Design:

[x] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [x] General purpose magetic field, trajectory and eddy current in 3D.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

CARMEN is an advanced program for the calculation of eddy currents in three dimensions. The algorithm used in CARMEN gives nearly optimal economy for magnetic field computation and it is implemented using state-of-the-art numerical methods. In addition to magnetic fields the program can also be used to model any system governed by Poisson's equation. This includes electrostatics and current flow.

Applications include fusion magnets, particle accelerators, MRI gradient field eddy currents, nondestructive testing, electrical machines, eddy current heating, electron lenses and deflection magnets.

CARMEN uses a discrete finite element model in order to solve the partial differential equations governing the behavior of a system.

The mesh is formed from hexahedra with 'ruled' faces which are automatically subdivided into elements. A 2D grid is created initially and this can then be swept through space thus creating 3D volumes. The sweep operations include translation, rotation and projection.

The mesh primitive blocks are assigned material names and geometric properties, for example orientation.

CARMEN uses 8 and 20 node isoparametric 'brick' elements. These can be mixed together; the program will enforce inter element continuity. The type of element created in each primitive may be selected by the user. This allows the higher order elements to be used where solution accuracy is important. Two result evaluation modes are provided to give a choice between speed and accuracy.

The suite of programs was designed to be used in a distributed computing environment. Data files created for CARMEN can be easily transferred between computers and result files from CARMEN can be returned. CARMEN provides full check point, drop file and restart facilities to maximize the efficient use of computer resources. The PCARMEN program allows results to be displayed graphically and further calculations can be performed, e.g. particle trajectories.

Publications describing the code:

CRI Emson, J. Simkin and CW Trowbridge, "Further Developments in Three Dimensional Eddy Current Analysis", IEEE Trans, MAG-21(1985) 2231.

Data Sheet Ref: 028671. From Vector Fields.

Is code documentation available? ☒ Yes ☐ No

How may the code be obtained?

By licence agreement with Vector Fields, Ltd.

Source language: FORTRAN 77

Computers it runs on: PRIME, VAX IBM

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format: As required
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Apr. 1985

Program Name: CAV3D, CAVIT

Person to Contact: Dr. Wolfgang Wilhelm
Address: Physik Department E12
Technische Universität München
Fed. Rep. Germany

Telephone Number: 089/3209 2435

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☒ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

CAVIT is a 2D-code for cavities with constant cross-section, the calculation is performed in a square mesh; accuracy is better than 1 percent.

CAV3D calculates low frequency modes of any cavity with a 3D cubic mesh, and accuracy of about 5 percent.

Publications describing the code:

W. Wilhelm, Particle Accelerators 12 (1984) 139

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

From the author

Source language: FORTRAN

Computers it runs on: Cyber, DEC-10

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Dec. 1985 Program Name: CCRTRACE

Person to Contact Roger Cole MS-810
Address: MS-H810, Group MP-1
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-7193, FTS 843-7193

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

CCRTRACE is a first-order envelope tracing code, currently for transverse effects only. The "guts" of CCRTRACE is a subroutine library with powerful, simple interface. The operator interface runs on color CRT in CCR or on VT640. It was designed for use on the Los Alamos Meson Physics Facility (LAMPF) accelerator.

Publications describing the code:

MP-1-3563-2 (A Los Alamos National Laboratory internal report).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Not readily available.

Source language: FLECS

Computers it runs on: VAX/VMS

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: July 1985 Program Name: CODINV

Person to Contact: John L. Warren
Address: Group AT-6, MS H-829
Los Alamos National Lab.
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 6677, FTS 843 6677

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [x] Closed Orbit Distortion Corrections

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A certain class of magnet misalignments in storage rings and other accelerators produces closed-orbit distortions (CODs). Quite often the CODs are measured at a fewer number of locations (N) than the number of misalignment parameters (M). There is a linear relation between COD measurements, u(j), j = 1, ..., N and the misalignment parameters e(k), k = 1, ..., M. Hence the e(k)'s are underdetermined. If M = 2N, one can obtain an overdetermined set of equations by measuring the COD at two different quadrupole settings. There are several ways of inverting the COD measurements to get misalignment parameters that are fairly insensitive to errors in the measured CODs. A computer program called CODINV has been written to test some of these schemes. Two schemes give fairly good results when applied to the lattice of the Los Alamos Proton Storage Ring (PSR). The first scheme requires measurements at two nearby tunes and the use of singular-value decomposition methods. The second scheme requires measurements of the CODs in the FODO and DOFO cell arrangements but is easier mathematically.

Publications describing the code:

J. L. Warren and P. J. Channell, "New Method for Inverting the Closed Orbit Distortion Problem," Part. Accel. Conf. Santa Fe, IEEE Trans NS-30(1983) 2415.

John L. Warren, "Determination of Magnet Misalignments from Measurement of Closed Orbit Distortion," Los Alamos National Laboratory Internal Report AT-6: ATN-83-13 (1983).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Barbara Blind, AT-3, MS H808, Los Alamos National Laboratory (505) 667-0130

Source language: FORTRAN IV

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 track, 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hks@lanl.arpa

Date of Latest Version: unknown

Program Name: COMFORT

Person to Contact: Hamid Shoaee
Address: SLAC Bin 26
P.O. Box 4349
Stanford, CA 94305

Telephone Number: (415) 854-3300 x 2954, FTS 461-9300 x 2954

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Insertion lines and circular machines.

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other: control

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A lattice program for analysis and control of charged particle beam transport systems. Main features include:

1) MAD style input format

2) Linear lattice parameter

3) Linear lattice matching

4) Chromaticity correction

5) Beam and RF parameter calculations for rings

Publications describing the code:

M. D. Woodley, M. J. Lee, J. Jäger, A. S. King, "Control of Machine Functions or Transport Systems," IEEE Trans NS 30 (1983) 2367

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Call Hamid Shoaee

Source language: FORTRAN 77

Computers it runs on: VAX (vms), IBM 3081 (vm)

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: 1986 Program Name: COSY 5.0

Person to Contact: Martin Berz or H. Wollnik
Address: II Physikal Institut
Heinrich Buffring 14-16
6300 Giessen,
Fed. Rep. Germany

Telephone Number: 641 702 2770

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [x] Cyclotron, [x] Synchrotron, [x] Optical Systems

Tracking or Simulation:
[ ] Linac, [x] Cyclotron, [x] Synchrotron, [x] optics

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Fifth order matrix transport and method of power series tracking, usual beam line elements, arbitrary field distributions and fringe fields, fitting capabilities, space charge (under development), very general input language.

Publications describing the code:

M. Berz, H.C. Hofmann and H. Wollnik, "COSY 5.0", Proceedings of Second Charged Particle Optics Conference, Albuquerque, 1986. To be published in "Nuclear Instrument and Methods".

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact above address

Source language: FORTRAN

Computers it runs on: VAX, Cyber CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [x] Diskette, [ ] Cards, [x] Networks
Tape format: as desired
Diskette size & format: as desired

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: ag21%dbngs1@rzbitnet

Date of Latest Version: 1968 Program Name: CURE

Person to Contact: M. D. J. MacRoberts
Address: MEE-DO, MS D460
Los Alamos National Lab.
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 8724

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [X] RF cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This program was used to calculate electromagnetic fields, frequency, and other pertinent quantities arising in the design of resonant cavities; it is a modified version of progrm LALA. CURE is capable of handling cavities of any reasonable cylindrically symmetric geometry described by a combination of straight line segments and circular arcs superposed on a square mesh, the size of which depends on the memory capacity of the computer. The cavity dimensions must be an integral number of mesh spacings. If this can not be done, one must run several cases with modified cavity dimensions which are integral multiples of the mesh spacing and interpolate the results for the actual cavity dimensions.

This code is now obsolete.

Publications describing the code:

M. D. J. MacRoberts and W. F. Rich, "Numeric solution of the fundamental mode of cylindrically symmetrical resonant cavities," Los Alamos National Laboratory internal report LA-4219.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language: FORTRAN

Computers it runs on: CDC 7600

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: 1974 Program Name: DECAY TURTLE

Person to Contact: Program Library, or C. Iselin
Address: CERN
DD Div., LEP Theory Group
CH-1211 Geneva 23
Switzerland

Telephone Number: (22) 83 23 77 or (22) 83 36 57

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [x] Synchrotron, [x] Beam Transport

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Tracking of particles with first- and second-order matrix formalism. Optional Decay included.

Publications describing the code:

CERN 71-02

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact C. Iselin. (You can also contact Dave Carey at Fermilab (312) 840-3639)

Source language: FORTRAN 66

Computers it runs on: IBM/CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: 9 track 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address: EGI at CERN VM

Date of Latest Version: 1980 Program Name: DE2D

Person to Contact: Fan Mingwu
Address: Institute of Atomic Energy
P. O. Box 275
Beijing
P. R. of China

Telephone Number: Beijing 868221 ext.341

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Calculate static magnetic field, electric field and eddy current problems in two cartesian dimensions or cylindrically symmetric configuration with permeable iron. It is based on Finite Element Methods and consists of three codes: MESH2D, DE2D, and DF2DD.

Publications describing the code:

Fan Mingwu, Maio Yixin and Yan Weili,"DE2D - Interactive Software Package for 2D Magnetostatic, Electrostatic and Eddy Current Field Computations," IEEE Trans. Mag 21(1985)2539.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Institute of Atomic Energy at above address

Source language: FORTRAN 77

Computers it runs on: VAX, PDP, IBM PC/XT

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [x] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: 1973 Program Name: DIFDIRA

Person to Contact: Herbert F. Vogel
Address: MS B220, Group X-2
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 8949, FTS 843 8949

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

2 d eddy currents and their magnetic field, driven from a current source with arbitrary pulse shape. Implementation by modification of the Poisson code, i.e., current normal to the (B_x, B_y) or (B_r, B_z) plane.

Publications describing the code:

None

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Source language: FORTRAN

Computers it runs on: CDC 7600

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1986 Program Name: DIMAD

Person to Contact: R. Servranckx
Address: SLAC
P.O. Box 4349
Stanford, CA 94025
USA

Telephone Number: (415) 854 3300 ext. 2741 or (306) 966 6054

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [x] Rings, Beam Lines

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [x] Rings, Beam Lines

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

1) General design fittings

2) Basis: Transport, 2nd order formalism

3) Closed orbit studies: stable or unstable special resonance extraction studies.

4) Extensive error and misalignment handling capabilities.

Publications describing the code:

SLAC Report 285 UC-28(A)

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Roger Servranckx

Source language: FORTRAN

Computers it runs on: VAX, IBM, CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9T 1600 BPI
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: RVS @ SLACVM

Date of Latest Version: 1981

Program Name: DISPER

Person to Contact: S. O. Schriber
Address: AT Division, MS H811,
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-7634, FTS 843-7634

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program DISPER does a weighted, non-linear, least squares fit to experimentally measured frequencies of mode spectra from arrays of rf cavities. The fit can be for singly or doubly periodic systems with up to second neighbor coupling constants and various end cavity terminations. The fit is to a model consisting of coupled RLC circuits.

Publications describing the code:

S. O. Schriber, "Fitting of an Ordered Set of Mode Frequencies," Atomic Energy of Canada Limited, Report No. AECL 3699 (1970).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

From the author/see above; H. Euteneur, Inst. für Kernphysik, Universität Mainz, Postfach 3960, 6500 Mainz, BRD; S. Inagaki, KEK National Laboratory for High Energy Physics, Oho-Machi, Tskuba-Gun, Ibaraki-Ken, JAPAN 300 32

Source language: FORTRAN

Computers it runs on: CDC, CYBER

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: July 1985

Program Name: DISPERSION

Person to Contact: Eric N. Opp
Address: MRJ Inc., Suite 200
10455 White Granite Dr.
Oakton, VA 22124
USA

Telephone Number: (202) 385 0818

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

DISPERSION calculates the frequency dispersion relation $\omega(k)$ for the azimuthally symmetric modes in a periodic array of rf cavities. The code is a modification of the SUPERFISH package. The codes LATTICE (mesh generator) and SUPERFISH were modified. LATTICE was modified to set up the appropriate periodic boundary conditions for the basic structure cell.

Publications describing the code:

R. L. Gluckstern and E. N. Opp, "Calculation of Dispersion Curves in Periodic Structures," IEEE Trans. MAG-21 (1985) 2344.

E. N. Opp, "Calculation of Dispersion Curves in Periodic Structures Using SUPERFISH," Los Alamos National Lab. Internal Report AT-6: ATN-85-4, (1985).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact the Los Alamos Code Group, MS H829, Los Alamos National Laboratory, Los Alamos, NM 87545, phone (505) 667-6677 or 667-2839.

Source language: FORTRAN

Computers it runs on: CRAY, VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 Track, 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET

Network Address: bks@lanl.arpa

Date of Latest Version: Nov. 1982

Program Name: EBQ

Person to Contact: Arthur C. Paul L-626
Address: Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: (415) 423 3183, FTS 543 3183

Classification of Computer Code:

Component Design:

[x] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Ion and Electron Guns

Accelerator Optimization:

[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [x] Particle Distribution

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The EBQ (electric field E, magnetic fields B, and space charge Q) code simulates steady state problems involving space charge transport of charged particles in cylindrically symmetric devices, providing a fairly flexible and forgiving data input structure.

This two-dimensional program accepts data specifying the externally applied electric and magnetic fields. The electric and magnetic self-fields of the particles are used to obtain self-consistent azimuthally symmetric charge and current distributions. The code follows particle trajectories and employs a unique method of assigning values of the charge density to grid points. This method provides sufficient accuracy to model the cancellation that occurs between radial electric and magnetic self-forces in a relativistic beam.

The orbits are treated in Cartesian geometry (position and momentum) with z as the independent variable. Poisson's equation is solved in cylindrical geometry on an orthogonal rectangular mesh.

EBQ can also handle problems involving multiple ion species where the space charge forces from each must be included. Such problems arise in the design of ion sources where different charge and mass states are present.

Publications describing the code:

Lawrence Berkeley Laboratory Internal Report LBL-13241

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Arthur Paul.

Source language: FORTRAN IV

Computers it runs on: CDC 7600

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: 7 track BCD,
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1986 Program Name: EDDYNET

Person to Contact: Larry Turner
Address: Argonne National Laboratory
9700 S. Cass Ave.
Argonne, IL 60439-4811
U.S.A.

Telephone Number: (312)972-6257, FTS 972 6257

Classification of Computer Code:

Component Design:

[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [x] Eddy Currents

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

EDDYNET uses a wire grid approach to solve eddy current problems. The conducting surface is approximated by a quadrilateral mesh of conducting lines. Line resistances and loop inductances are defined in a manner consistent with the approximation. The system of loop equations, with a dense matrix, is solved repeatedly to give the time development of the eddy currents, magnetic field, and dissipated power

Publications describing the code:

L. R. Turner and R. J. Lari,"Developments in Eddy Current Computations with EDDYNET," IEEE Trans. MAG-19(1983)2577-80

L. R. Turner,"Eddy Current Analysis of the ZT-P Shells with EDDYNET," Computational Electronics, Elsevier Science Publishers (1986) pp.181-89

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Contact Larry Turner

Source language: FORTRAN

Computers it runs on: IBM, CRAY

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: unknown

Program Name: EFFI(3D)

Person to Contact: S. J. Sackett
Address: L-122
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: (415) 422-8709, FTS 532-8709

Classification of Computer Code:

Component Design:
☐ Ion Source, ☒ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

EFFI calculates the electromagnetic field and vector potential in coil systems of arbitrary geometry. The coils are made from circular arc and/or straight segments of rectangular cross-sectional conductor. EFFI can also calculate magnetic flux lines, magnetic force, and inductance. The methods used for the calculations are based on a combination analytical and numerical integration of the Biot-Savart law for a volume distribution of current. These methods yield accurate field values inside and outside the conductor.

Publications describing the code:

Steven J. Sackett, "EFFI – A Code for Calculating the Electromagnetic Field, Force and Inductance in Coil Systems of Arbitrary Geometry," Lawrence Livermore Laboratory, Internal Report UCRL-52402, (1978).

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

unknown

Source language: unknown

Computers it runs on: CDC

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: May, 1986 Program Name: EGUN

Person to Contact: W. B. Herrmannsfeldt
Address: SLAC
SLAC Bin 26
Stanford University
Stanford, CA 94305

Telephone Number: (415) 854 3300, FTS 461 9300, ext 3342

Classification of Computer Code:
Component Design:
[x] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Gun Design

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The program is specifically written to compute trajectories of charged particles in electrostatic and magnetostatic focusing systems including the effects of space charge and self-magnetic fields. Starting options include Child's Law conditions on cathodes of various shapes. Either rectangular or cylindrically symmetric geometry may be used. Magnetic fields may be specified using arbitrary configurations of coils, or the output of a magnet program such as Poisson or by an externally calculated array of the axial fields.

Publications describing the code:
SLAC 226.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?
Write or call W. B. Herrmannsfeldt.

Source language: FORTRAN

Computers it runs on:
It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: SLACVM6WBHAP

Date of Latest Version: Oct. 1985 Program Name: EMD (Expert Magnet Design)

Person to Contact: Ann Aldridge
Address: Group C-3, MS B265
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-7047, FTS 843-7047

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

An AI (Expert) program for designing "H" type dipole bending magnets. Given particle, energy, bend angle, etc., it designs the coil using LAMPF Standard conductor, determines ΔP, ΔT, V, I, power and prints out cross section coordinates in Poisson format for advanced field quality design.

Publications describing the code:

Internal notes; For technical info contact Ed Bush, MP-8 LANL, (505) 667-5968

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

See Ann Aldridge

Source language: LISP

Computers it runs on: VAX or VMS with UNIX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: as desired
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: May 1986

Program Name: EVOL

Person to Contact: Steve Peggs MS 90/4040
Address: URA Design Center
c/o UCLBL
Berkeley, CA 94720
USA

Telephone Number: (415) 486-4772, 486-6559, FTS 451-4772

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other: Beam-Beam Interaction.

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

EVOL is a tracking program that includes sextupoles, multiple beam-beam collisions, external tune modulation, and other effects. Its construction emphasizes operational speed and the nested scanning of two or three configuration variables, such as betatron tune, amplitude and chromaticity, at the expense of simplification in the physical model.

EVOL was originally written at CERN to simulate nonlinearities in the SPS collider. It is now being used and developed further, in round and flat beam versions, at the Cornell Electron Storage Ring, CESR. Single particles are tracked for many turns, for example 10^5, around a nonlinear lattice in the presence of a set of physical effects chosen by the user from a "library". These effects interact with each other strongly or weakly, in ways that are theoretically understood to a greater or lesser degree.

Publications describing the code:

S. Peggs "Hadron Collider Behavior in the Nonlinear Numerical Model EVOL," Part. Acc. 17 (1985) 11.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Steve Peggs.

Source language: FORTRAN 77

Computers it runs on: VAX VMS, IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: whatever
Diskette size & format:

Available through: [x] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: sgp@lbl

Date of Latest Version: 1970

Program Name: FATIMA

Person to Contact: C. Iselin
Address: LEP Theory Group
CERN
CH-1211 Geneva 23
Switzerland

Telephone Number: (22) 83 36 57

Classification of Computer Code:

Component Design:
☐ Ion Source, ☒ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

2nd order Finite Element

Publications describing the code:

None

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

Obsolete. Code not obtainable.

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address: fer@cernvm

Date of Latest Version: Dec. 1986

Program Name: GENMAP 3.0

Person to Contact: Alex J. Dragt
Address: Dept. of Physics
University of Maryland
College Park, MD 20742
USA

Telephone Number: (301)454-7324

Classification of Computer Code:

Component Design:
[ ] Ion Source, [*] Magnet, [ ] R.F. cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

GENMAP 3.0 is a program to compute numerically transfer maps (through third order) for arbitrary beamline elements using Lie algebraic methods. The code uses canonical variables (x, p_x, y, p_y, t, p_t). To study a particular beam element or transport system, the user must modify a subroutine to specify the Hamiltonian as a power series around the design trajectory. This involves specifying the electromagnetic fields in question (and various derivatives) by analytic approximations or interpolation tables. The output of GENMAP is the Lie algebraic transfer map for the system under study. GENMAP is generallly used to compute transfer maps for beamline elements with fringe fields. These maps can be utilized by MARYLIE 3.0 for tracking and analysis of transport systems with realistic fringe fields. GENMAP can also be incorporated as a subroutine in MARYLIE 3.0 for optimization of systems with fringe fields.

Publications describing the code:

R. Ryne, "Numerical Computation of Transfer Maps using Lie Algebraic Methods," Los Alamos National Lab. internal report AT-6:ATN-86-21 (June 1986).

R. Ryne, "Numerical Computation of the Transfer Map for a Magnetic Dipole with Mid-Plane Symmetry using Lie Algebraic Methods," Los Alamos National Lab. internal report AT-6:ATN-86-25 (August 1986).

A. Dragt et al, "MARYLIE 3.0, A Program for Charge Particle Beam Transport Based on Lie Algebraic Methods," 1985 User's Guide; unpublished.

A. Dragt and E. Forest, J. Math. Phys. 24(1984)2734.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Two versions are on mass storage at Los Alamos National Laboratory:
(1) 092680 dec86 sgenrec The version for a Rare Earth Cobalt quadrupole magnet
(2) 092680 dec86 sgendip The version for a magnetic dipole with midplane symmetry.
These are "standard text" versions of the source file. The code can also be obtained form the Los Alamos Accelerator Code Group, contact Helen N. Stokes at (505)667-9131 or 2839, (FTS 843-9131).

Source language: FORTRAN 77

Computers it runs on: Any supporting FORTRAN 77

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☒ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☒ ARPANET, ☒ BITNET
☐

Network Address: hks@lanl.arpa

Date of Latest Version: unknown

Program Name: GFUN-3D

Person to Contact: A. G. A. M. Armstrong
Address: Rutherford Lab. Corp.
Chilton, Didcot
Oxon, OX11 0QX
England

Telephone Number: Abingdon 21900, ext. 458

Classification of Computer Code:
Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF-cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The GFUN 3D computer program is primarily a design tool for calculating the magnetic fields for a system of conductors and non-linear (variable permeability) magnetic materials in three dimensions. The package was developed at the Rutherford Laboratory for use with the IBM 360/195 computer and interactive graphics terminal. (It has been superseded by TOSCA.)

Publications describing the code:

M. J. Newman, C. W. Trowbridge and L. R. Turner, "GFUN: An Interactive Program as an Aid to Magnet Design," Proc. Int. Conf. Magnet Technology (MT-4), Brookhaven National Laboratory (1972).

L. R. Turner, "Direct Calculation of Magnetic Fields in the Presence of Iron, as Applied to the Computer Program GFUN," Rutherford Lab. Internal Report RL-73-102, (1973).

A.G.A.M. Armstrong, C. J. Collie, N. J. Diserens, M. J. Newman, J. Simkin, C. W. Trowbridge, "New Developments in the Magnet Design Computer Program GFUN," Rutherford Laboratory internal report RL-75-066, (1975) (Also available from US-NTIS).

A. G. Armstrong et al, "GFUN3D User Guide," Rutherford Lab. Internal Report RL-76-029/A, (1976).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Vector Fields, Ltd., Osney Mead, Oxford OX2 OEE, England; Phone 0865 248236.

Source language: FORTRAN

Computers it runs on: PRIME, VAX, IBM

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: GIANT

Person to Contact: Hamid Shoaee
Address: Stanford Linear Accelerator Center
P.O. Box 4349, SLAC Bin 26
Stanford, CA 94305
USA

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other: Control Program.

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Many model-driven diagnostic and correction procedures have been developed at SLAC for the on-line computer controlled operation of SPEAR, PEP, the LINAC, and the Electron Damping Ring. In order to facilitate future applications and enhancements, these procedures are being collected into a single program, GIANT. The program allows interactive diagnosis as well as performance optimization of any beam transport line or circular machine. The test systems for GIANT are those of the SLC projects.

Publications describing the code:

J. Jäger, M. Lee, R. Servranckx and H. Shoaee, "GIANT - A Computer code for General Interactive Analysis of Trajectories" IEEE Trans. NS 32 (1985) 1877-82.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Unknown.

Source language: FORTRAN 77

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: GOBLIN

Person to Contact: C. Kost
Address: TRIUMPH, Univ. B. C.
4004 Wesbrook Mall
Vancouver, B.C.
Canada V6T 2A3

Telephone Number: 604 2221047, ext. 310

Classification of Computer Code:

Component Design:

☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☒ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:

☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

None available

Publications describing the code:

None available

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

This code is not "portable" to any other institution.

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks

Tape format:

Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: unknown

Program Name: GOC3D

Person to Contact: A. C. Paul
Address: MS L-626
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: (415) 423-3183, FTS 543-3183

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [X] General Magnetic Field

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

GOC3D is a general orbit code incorporating a flexible selection of magnetic field input geometries encountered in polar accelerator design. The code calculates the field as the sum of fields obtained from up to two independent field arrays. The main field array can be either radial (1 dimensional), median plane polar (2 dimensional) non-median plane (two dimensional r, z, input of B_z and B_r) or three dimensional with input of B_z, B_r, and B_θ. For median plane expansion the code is accurate to z^2. The code takes z as the independent variable and will trace rays, track phase space, or determine equilibrium orbit properties of the magnetic field.

Publications describing the code:

Unknown.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Unknown.

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: obsolete

Program Name: GRAPHIC

Person to Contact: Robert J. Lari
Address: Argonne National Laboratory
9700 S. Cass Ave.
Argonne, IL 60439
USA

Telephone Number: (312) 972-6632, FTS 972-6632

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: An executive program

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

GRAPHIC is an executive program for the three magnet design computer programs in use at the Zero Gradient Synchrotron of Argonne National Laboratory TRIM, MAGNET and GFUN. These programs are used in the time-sharing mode in conjunction with a Tektronix model 4012 graphic display terminal.

Publications describing the code:

R. J. Lari, "GRAPHIC: Time-sharing Magnet Design Computer Programs at Argonne," Proc. of Fifth International Conference on Magnet Technology, Frascati, Published by Comitato Nazionale per l'Energia Nucleare, Italy (1975) 244-255.

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

(No longer available)

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Oct. 1985 Program Name: HARMON

Person to Contact: Martin Donald
Address: SLAC
P.O. Box 4349
Stanford, CA 94305
USA

Telephone Number: 415-854-3300, ext. 3205

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other: Beam Line Optimizer

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Purpose: To optimize the strength of sextupole correction magnets to improve beam dynamics.

Algorithms: Least Squares minimization of a set of nonlinear functions including tune shift versus momentum, tune shift versus amplitude and distortion of phase space.

A new version will be released with the data-based version of MAD.

This version will have data input closely resembling that of MAD.

The code at present will only handle closed machines. It is hoped to extend it to handle beam lines as well.

Publications describing the code:

M. Donald, "Chromaticity Correction in Circular Accelerators and Storage Rings. A User's Guide to the HARMON Program." PEP Note 311 (1979).

M. Donald and D. Schofield, "A User's Guide to the HARMON Program," CERN LEP Note 420

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Code is a module of the program MAD by F. C. Iselin (CERN).

Code is presently only documented by publications above

Source language: FORTRAN 77

Computers it runs on: CDC, IBM, VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☒ Networks
Tape format: ASCII or EBCDIC
Diskette size & format:

Available through: ☒ DECNET, ☐ ARPANET, ☒ BITNET
☐

Network Address: MHD@SLACVM (BITNET), MHD@SLACPCR (BITNET), PCR::MHD (DECNET).

Date of Latest Version: Jan. 1984 Program Name: HAX

Person to Contact: Masahiro Hara
Address: Cyclotron Laboratory
RIKEN (The Institute of Physical and Chemical Research)
WAKO, SAITAMA, 351-01.
Japan

Telephone Number: 0484-62-1111 ext. 4011

Classification of Computer Code:

Component Design:

☐ Ion Source, ☐ Magnet, ☒ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:

☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

To calculate resonant frequencies, electric lines of force, magnetic lines of force, electric fields, and magnetic field for axi-symmetric modes (TM or TE). Based on finite element method.

Publications describing the code:

M. Hara, T. Wada, A. Toyama, and F. Kikuchi, "Calculation of RF Electromagnetic Field by Finite Element Method," Scientific Papers of the Institute of Physical and Chemical Research, 75 (1981) 143-75

Is code documentation available? ☒ Yes ☐ No

How may the code be obtained?

contact author

Source language: FORTRAN 77

Computers it runs on: FACOM M380

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format: NL/SI 1600 bpi
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1984 Program Name: H2DB

Person to Contact: Masahiro Hara
Address: Cyclotron Laboratory
Riken (The Institute of Physical and Chemical Research)
WAKO, SAITAMA, 351-01,
Japan

Telephone Number: 0434-62-1111 ext. 4011

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

To calculate cut-off frequencies, electric lines of force, and magnetic lines of force for waveguide with arbitrary cross section. Mesh generator and graphic display codes are included. Based on finite element method.

Publications describing the code:

M. Hara, T. Wada, A. Toyama and F. Kikuchi, "Calculation of RF Electromagnetic Field by Finite Element method," Scientific Papers of the Institute of Phyical and Chemical Research, 75 (1981) 143-175.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact author

Source language: FORTRAN 77

Computers it runs on: FACOM M380

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: NL/SL, 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Oct. 1986 Program Name: HETC

Person to Contact: Richard E. Prael
Address: MS B266, X-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505)667 7283, FTS 843 7283

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other: Target and shielding design

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Transport of nucleons, pions, and muons in general 3D geometry. Interaction physics by Bertini intranuclear cascade model with evaporation model. Couples to MCNP for transport of low energy neutrons and photons.

Publications describing the code:

R. E. Prael, "High-Energy Particle Monte Carlo at Los Alamos," Los Alamos National Lab. internal report LA-UR-85-1243.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Original ORNL version is available from Radiation Shilding Information Center (RSIC); Los Alamos version available upon special request from R. Prael.

Source language: FORTRAN

Computers it runs on: CDC7600 and CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: HOPI

Person to Contact: J. L. Le Maire
Address: Brookhaven National Laboratory
Upton, L.I., NY 11983
USA

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other: Control

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

HOPI, an on-line computer program written on the PDP 10, matches the beam from the 200 Mev linac to the AGS without the necessity of making emittance measurements; it performs the matching by modifying independently the horizontal and vertical emittance. Experimental results show success with this method, which can be applied to any matching section.

Publications describing the code:

Le Maire, J. L., "HOPI: On line Injection Optimization Program," Brookhaven National Laboratory internal report no. BNL-50741 (1977) 30p.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language:

Computers it runs on: PDP 10

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: June 1986 Program Name: ISIS

Person to Contact: Michael E. Jones
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-7760, FTS 843-7760

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: Modeling of intense charged particle beams.

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ISIS is a fully relativistic PIC code that can handle time-dependent electromagnetic fields. It has been applied to wakefield problems in plasmas and photocathode electron source design for FEL's. There are a wide variety of options, including 1 dimensional and 2-1/2 dimensional geometry, cylindrical and Cartesian coordinates, multiple internal boundary, emission and particle creation, and optimization on CRAY computers.

Publications describing the code:

None

Is code documentation available? ☐ Yes ☒ No

How may the code be obtained?

Contact M. Jones. Note: This code is not easily transportable because it has been optimized for the Los Alamos CRAY's.

Source language: CFT1.14,CAL

Computers it runs on: CRAY'S at LANL

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Nov. 1984 Program Name: ITS (INTEGRATED TIGER SERIES)

Person to Contact: H. Grady Hughes III
Address: MS B-226, X-6
Los Alamos National Laboratory
Los Alamos, N M 87545
USA

Telephone Number: (505)667-3926, FTS 843-3926

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other: Charged Particle Transport Code.

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Electron/photon Monte Carlo transport code. ITS is actually a system of eight codes: TIGER, TIGERP, CYLTRAN, CYLTRANP, CYLTRANM, ACCEPT, ACCEPTP, AND ACCEPTM. Special features include:

1) Generalized 1-d, 2-d and 3-d analytic geometry

2) Complete particle cascade

3) External EM fields

4) Cerenkov & transition radiation

5) Well verified by experiment

These codes have been used to simulate the interaction of electron beams, generated by pulsed-power accelerators, with various target materials. They are based on the ETRAN system, which was developed for an energy range from 10 keV up to a few tens of MeV. Modifications have extended their applicability up to 1 GeV. Physical theories used in the code are equivalent to those employed in the SANDYL code.

Publications describing the code:

M. J. Berger, "Monte Carlo Calculation of the Penetration and Diffusion of Fast Charged Particles," Methods in Computational Physics, Vol. 1, Academic Press, New York (1963).

J. A. Halbleib and T. A. Mehlhorn, Sandia Report SAND81-0573, November 1984.

T. A. Mehlhorn and J. A. Halbleib, "Monte Carlo Benchmark Calculations of Energy Deposition by Electron Photon Showers Up to 1 GeV," Proc. of Amer. Nuc. Soc. Top. Conf. on Computational Methods, Sandia Natic nal Labs. Internal Report No.: SAND 82-2230C; CONF 830301-2 (1983)7p.

J. M. Peek and J. A. Halbleib, "Improved Atomic Data for Electron Transport Predictions by the Codes TIGER and TIGERP. II Electron Stopping and Range Data," Sandia National Lab. Internal Report No. SAND 83-0181(1983)43p

Is code documentation available? ☒ Yes ☐ No

How may the code be obtained?

Contact Groups X-6 at Los Alamos or J.A. Halbleib at Sandia National Laboratory , Org.1231, Bldg.960, Albuquerque, NM 98123; telephone (505)844-1575 or FTS 884-1575.

Source language: FORTRAN 77

Computers it runs on: CRAY, VAX, CDC 7600, IBM

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☒ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format: VAX BACKUP
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: unknown

Program Name: JASON

Person to Contact: S. J. Sackett
Address: MS L-122
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: (415) 422 8709 or FTS (415) 532 8709

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Electrostatics

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

JASON solves general electrostatics problems having either slab or cylindrical symmetry. More specifically, it solves the self-adjoint elliptic equation, $\nabla\cdot(K\nabla V) - \gamma V + \rho = 0$ in an arbitrary two-dimensional domain. For electrostatics, V is the electrostatic potential, K is the dielectric tensor, and ρ is the free-charge density. The parameter γ is identically zero for electrostatics but may have a positive nonzero value in other cases (e.g., capillary surface problems with gravity loading). The system of algebraic equations used in JASON is generated by the finite element method. Four-node quadrilateral elements are used for most of the mesh. Triangular elements, however, are occasionally used on boundaries to avoid severe mesh distortions.

Publications describing the code:

S. J. Sackett, "JASON – A Code for Solving General Electrostatics Problems. User's Manual," LLNL internal report (1978), also available from US NTIS (Natl. Tech. Info. Serv.) as report UCID-17814.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1984

Program Name: KN7C

Person to Contact: E. Keil
Address: LEP Division
CERN
1211 GENEVA 23
Switzerland

Telephone Number: 41-22-83.34.26

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [x] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Finds the resonant frequencies, the field pattern and the longitudinal loss factors for axisymmetric waveguide modes propagated at $v = c$ in disk-loaded waveguide by field matching, using matrix techniques.

Publications describing the code:

E. Keil, Nucl. Instr. Meth. 100 (1972) 419.

E. Keil, in Phys. of High Energy Particle Accelerators, AIP Conf. Proc. No. 105 (1983).

E. Keil, CERN 84-01 (1984).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact E. Keil

Source language: FORTRAN 5

Computers it runs on: CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: As desired
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: KEIL at CERNVM

Date of Latest Version: 1986

Program Name: KOBRA

Person to Contact: P. Spädtke
Address: GSI-DARMSTADT
Postfach 11 05 41
6100-DARMSTADT
Fed. Rep. Germany

Telephone Number: 6151-359-323

Classification of Computer Code:

Component Design:

[x] Ion Source, [ ] Magnet, [ ] RF-cavity, [x] low energy (DC) beam.

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other: Transport/space charge effects.

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

KOde zur Berechnung RAumladungsbehafteter teilchenbahnen im-d raum.

KOBRA3 calculates the trajectories of charged particles in static electro-magnetic fields in three dimensions, including extraction problems. The electric field is determined by the potential distribution from the given electrode arrangement. Space charge is taken into account by an iterative process. The self-consistent formation of a plasma meniscus can be calculated. The magnetic field distribution is either analytically determined or read in from a table; six types of distribution are offered. The potential fields of any plane may be displayed as equipotential line drawings or by 3D diagrams, in which the potential is represented as the third coordinate. The calculated particle trajectories can be displayed by emittance diagrams, represented in two dimensions by projection onto any plane, or as three dimensional diagrams.

KOBRA is partitioned into eight programs, KOBRA1, KOBRA2, KOBRA3 and KOBRA4, which calculate the mesh, the potential, the magnetic field and the particle trajectories respectively; KOBRA5, KOBRA6, KOBRA7, and KOBRA8, which display the results.

Publications describing the code:

P. Spädtke, "KOBRA3 - Three Dimensional Raytracing Including Space-Charge Effects," IEEE Trans. NS-32 (1982) 2465.

Examples in Proceedings of Linac Conference/Seeheim 1984. GSI, Darmstadt internal report GSI-84-11 (see conference index under Spädtke.)

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Implementation on request.

Source language: FORTRAN 77

Computers it runs on: IBM, VAX

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☒ BITNET
☐

Network Address: ul13%DDAGSI3.BITNET

Date of Latest Version: 1977 Program Name: LACC

Person to Contact: A. Konrad
Address: General Electric
Corporate Research and Development
Building 37, Room 355
Schenectady, NY 12301
USA
Telephone Number: (518) 387 5083

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Linear Accelerator Cavity Code solves the classical electromagnetic field problem of the empty, axially symmetric resonator with conducting walls. The program algorithm is based on a variational formulation coupled with the high-order polynomial, triangular finite element method for the magnetic field calculation. Various other numerical methods such as one- and two-dimensional Newton-Cotes integration are used to obtain the performance measuring quantities (e.g. transit time factor, stored energy, power loss, shunt impedance, Q-factor). This is a modification of a 1973 program called AXISYMM - VECTOR - HELMHOLTZ - FINTEL6.

Publications describing the code:

A. Konrad, "A Linear Accelerator Cavity Code Based on the Finite Element Method," Comput. Phys. Commun. v 13, (1978) 349 362.

A. Konrad, "A Linear Accelerator Cavity Field Calculation by the Finite Element Method," IEEE Trans. NS 20 (1973) 802 808.

A. Konrad, "Evaluation of the LACC Program," Comput. Phys. Commun. (Netherlands) v 1433, (1078) 177 184[1].

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

CPC Program Library, Queen's University of Belfast, N. Ireland.

Source language: FORTRAN IV

Computers it runs on: IBM 360 75

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: 1965 Program Name: LALA

Person to Contact: Harry C. Hoyt
Address: DIR-OFC, MS A103
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-2917, FTS 843-2917

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☒ RF cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This was an rf cavity code used in the design of the LAMPF (800 MeV) accelerator. The code is obsolete.

Publications describing the code:

H. C. Hoyt, Numerical studies of the shapes of drift tubes and linac cavities. IEEE Trans. Nucl. Sci. 12, (1965) 153-155.

H. C. Hoyt, W. F. Rich, and D. D. Simmons, Computer designed 805-MHz proton linac cavities. Rev. Sci. Instrum. 37, (1966) 755-762.

H. C. Hoyt, Designing resonant cavities with the LALA computer program. Proc. Linear Accelerator Conf., Los Alamos, New Mexico, LA-3609 (1966) 119-124. Clearinghouse for Fed. and Tech. Inform., Nat. Bur. Stand., U.S. Dept. of Commerce, Springfield, Virginia.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: LALAGE

Person to Contact: P. Fernandes
Address: Istituto per la Matematica Applicata
del C.N.R.
Genova,
Italy

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LALAGE is an improved version of the LALA program to compute resonant frequencies and fields for all the modes of the lowest TM_{01} band-pass of multicell structures.

Publications describing the code:

P. Fernandes, R. Parodi, "LALAGE - A Computer Program to Calculate the TM_{01} Modes of Cylindrically Symmetrical Multicell Resonant Structures," Part. Accel. 12(1982)131-7.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown.

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: LANS

Person to Contact: B. M. Fomel
Address: USSR Academy of Sciences
Siberian Division
Institute of Nuclear Physics
Novosibirsk, 90
USSR
Telephone Number:

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LANS is a code developed for calculation of axisymmetric cavities. The mathematical basis of this code is the method of inverse iterations with a shift, which is the most adequate for the problem of finding the eigenfrequencies and fields for the cavities. This code has some advantages compared with SUPERFISH; it requires a smaller number of operations necessary for calculations and it gives better resolution of resonance modes with close frequencies.

Publications describing the code:

B. M. Fomel; V. P. Jackowlev; M. M. Karliner; P. B. Lysyansky, "LANS — A New Code for Evaluation of the Electromagnetic Fields and Resonance Frequencies of Axisymmetrical RF Cavities," Part. Accel. (United Kingdom) 11 (1981) 173-9.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: LATTICE

Person to Contact: John Staples
Address: Lawrence Berkeley Laboratory
Bldg. 64, Room 224A
1 Cyclotron Rd.
Berkeley, CA 94720

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LATTICE is a computer code which enables an interactive user to calculate the functions of a synchrotron lattice. This program satisfies the requirements at LBL for a simple interactive lattice program by borrowing ideas from both TRANSPORT and SYNCH. A fitting routine is included.

A version of LATTICE exists that is written in BASIC and runs on HP 9845.

John Staples and Arthur C. Paul have diverging versions in Pascal which run on the IBM PC. The latter version is self booting with complete on line documentation. Address: Arthur C. Paul, MS L-626, Lawrence Livermore National Laboratory, P.O. Box 808, Livermore, CA 94550.

Publications describing the code:

John Staples, "LATTICE: An interactive lattice computer code," LBL internal report no. LBL-4843, (1976) 18p

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact John Staples

Source language: FORTRAN

Computers it runs on: CDC 6600

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: July 1986 Program Name: LIEPOT

Person to Contact: Etienne Forest
Address: MS 90/4040
URA Design Center
c/o UCLBL
Berkeley, CA 94720
USA
Telephone Number: (415) 486 6580 or FTS 451 6580

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LIEPOT generates a Lie-algebraic map that produces tracking results equivalent those produced by the code TEAPOT. This allows the user to interface with the code MARYLIE and hence calculate auxiliary quantities such as chromaticity and nonlinear invariants. The results are equivalent to 6x6 third order transport matrices.

Publications describing the code:

E. Forest, "Lie Algebraic Maps and Invariants Produced by Tracking Codes," SSC Design Group internal report no. 78 (1986).

Lie Algebraic Maps and Invariants Produced by Tracking Codes.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Contact Etienne Forest.

Source language: FORTRAN 77

Computers it runs on: CRAY XMP, VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: As desired.
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: LILA

Person to Contact: Jim Niederer
Address: Brookhaven National Laboratory
Upton, L.I., NY 11973
USA

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LILA was an BNL attempt to create a particle orbit and tracking program ensemble for large storage ring accelerator design and also controls operation. The accelerator physics parts are based largely on the PATRICIA program.

LILA is now defunct.

Publications describing the code:

John Niederer, "LILA: The Long Island Lattice Analogue," Brookhaven National Lab. internal report no. BNL-31370 (1982).

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Code is not available.

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1980

Program Name: LIMATRA

Person to Contact: G. von Holtley
Address: LEP Theory Division
CERN
1211 GENEVA 23
Switzerland

Telephone Number: CERN 41-22-83.53.93

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A fast and flexible many particle tracking code in transverse and longitudinal phase space, using matrix formalism and lumped linear or non linear perturbations with systematic, harmonic or random azimuthal distributions. In particular it is useful for studies of non linear resonances, etc.

Publications describing the code:

"User Guide to the Synchrotron Tracking Computer Program LIMATRA," G. Von Holtley, LAB II-DI-PA/Int 75-3

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

From author

Source language: FO

Computers it runs on:

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1970

Program Name: LINDA

Person to Contact: Stanley Snowdon
Address: FNAL
P.O. Box 500
Batavia, IL 60510
USA

Telephone Number: (312) 840 3804, FTS 370 3804

Classification of Computer Code:

Component Design:

[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LINDA uses a combination of scalar and vector potentials to model 2-D magnetostatic problems. The code is very accurate and can handle up to 30,000 mesh points. Will handle iron with nonuniform permeability. Main limitation is that there can be only one region of iron in the problem. Input is much simpler than that for POISSON.

Publications describing the code:

J. S. Colonias, "Particle Accelerator Design Computer Programs," Academic Press, New York (1974) 39-62.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Contact Stan Snowdon.

Source language: FORTRAN

Computers it runs on: IBM 360/75, CDC 6600.

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1984 Program Name: LOOPER

Person to Contact: S. O. Schriber
Address: AT Division, MS H811
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-7634, FTS 843-7634

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]

Accelerator Optimization:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[x] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program LOOPER calculates the rf characteristics (as seen by the drive and/or component elements) of coupled rf resonators using coupled RLC circuit theory. Input of cavity Q and impedance permits calculation of power losses and average on-axis fields that agree very well with multicell SUPERFISH calculations. The program handles off-resonance characteristics, all passband modes, beam loading, multi-neighbor coupling, each element different, stability, and bridges between linacs.

Publications describing the code:

None

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

From the author/see above; H. Enteneur, Inst. für Kernphysik, Universität Mainz, Postfach 3980, 6500 Mainz, BRD; S. Inagaki, KEK National Laboratory for High Energy Physics, Oho-Machi, Tsukuba-Gun, Ibaraki-Ken, JAPAN 300-32

Source language: FORTRAN

Computers it runs on: CDC, CYBER

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Nov. 1986 Program Name: LTRACK

Person to Contact: Dominic Chan
Address: AT-6, MS H829
Los Alamos National Lab.
Los Alamos, NM 87545
USA

Telephone Number: (505)665-0376 or FTS 845-0376

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LTRACK is a first order-matrix, beam-transport code that takes into account the longitudinal wake-force of the monopole modes and the transverse wake force of the dipole and quadrupole modes. Provision is made for error analysis, including orbit correction. It has been used in the study of wake effects in the Stanford Linear Collider (SLC) and in the Los Alamos Free Electron Laser Energy Recovery Experiment (FEL ERX). The present version is very similar to that developed at SLAC by Karl Bane, except that bending magnet and edge rotation has been added. A user's package with explanations for code installation has been prepared.

Publications describing the code:

A. W. Chao and R. K. Cooper, "Transverse Quadrupole Wakefield Effects in High Intensity Linacs," Part. Accel. 13(1983)1-12

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Dominic Chan or The Los Alamos Accelerator Code Group by calling Helen K. Stokes, (505)667-9131 or -2839

Source language: FORTRAN

Computers it runs on: CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET

Network Address: lbl-csa.arpa

Date of Latest Version: 1986

Program Name: MAD

Person to Contact: C. Iselin
Address: LEP Theory Group
CERN
CH-1211 Geneva 23
Switzerland

Telephone Number: (22) 83 36 57

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Programming system with a common data base for optics and design. Includes survey, linear lattice, matching, tracking.

Publications describing the code:

C. Iselin, "The MAD Program," CERN-LEP/TH-85/15

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Tape or Network.

Source language: FORTRAN 77

Computers it runs on: IBM, CDC, VAX, NORD

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 track 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: FCI-9 CERNVM

Date of Latest Version: 1987

Program Name: MADEST

Person to Contact: K. M. Thompson
Address: Argonne National Laboratory
9700 S. Cass Ave., Bldg. 360
Argonne, IL 60439
U.S.A.

Telephone Number: (312)972 6265 or FTS 972 6265

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MADEST is an interactive program used to develop the geometrical designs for the cores and conventional coils of various types of magnets. It does NOT involve magnetic field calculations. From the designs MADEST can be used to develop cost estimates for designing, fabricating, and installing systems of magnets. The code is under development.

Publications describing the code:

K. M. Thompson,"An interactive Computer Program for the Design and Costing of Magnets," Journal de Physique C1(1984) January)

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Contact K. M. Thompson

Source language: The FORTRAN version is still under development; also Hewlett Packard BASIC

Computers it runs on: VAX, HP9845, HP200, and HP300.

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: MAFCO

Person to Contact: J. C. Brown
Address: MS L561
Lawrence Livermore National Laboratory
P.O. Box 808,
Livermore, CA 94550

Telephone Number: (415) 423-4157

Classification of Computer Code:

Component Design:

☐ Ion Source, ☒ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:

☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program MAFCO is capable of calculating the magnetic fields resulting from a given set of current-carrying conductors of arbitrary two- or three- dimensional geometry in which no permeable material is present. The elements which comprise the generalized coil geometry are:

1. Circular loops with designated position and orientation in space.

2. Circular arcs with designated position and orientation in space.

3. Helices along the z axis (in the cylindrical coordinate system) with any designated pitch, starting point, and ending point.

4. Straight lines with any arbitrary orientation.

5. General elements specified by a list of points which the program connects with straight lines.

All of these elements are assumed to be infinitely thin.

Arthur C. Paul (see TRANSPORT for address) has a Pascal version which runs on the IBM PC.

Publications describing the code:

J. C. Brown and W. A. Perkins, "MAFCO – A Magnetic Field Code for Handling General Current Elements in 3-D," Univ. of California Internal Report no. UCRL-7741 (1966).

John S. Colonias, "Particle Accelerator Design: Computer Programs," Academic Press (1974) pp. 119-28.

A plotting code with documents also exists: T. N. Hanatani, R. W. Moir, "A Code for Viewing MAFCO Conductors from any Angle," Univ. of California Internal Report no. UCRL-51307 (1973).

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language: FORTRAN

Computers it runs on: CDC 6600/7600

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks

Tape format:

Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: unknown

Program Name: MAFCO III

Person to Contact: S. J. Sackett
Address: MS L-122
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: (415) 422-8709, FTS 532-8709

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☒ Linac, ☐ Cyclotron, ☒ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program MAFCOIII is a combination of MAFCO and ZAM. MAFCO performs the calculation of the magnetic and/or electric fields resulting from the coil configuration specified; while ZAM performs the step-by-step solution of the system of first-order differential equations, by fourth-order Adams-Moulton predictor-corrector method, to obtain the particle trajectories desired. The program is extremely flexible, as evidenced by the generalized coil geometry that MAFCO accepts.

Publications describing the code:

W. A. Perkins and S. J. Sackett, "MAFCOIII - A Code for Calculating Particle Trajectories in Magnetic and Electric Fields" Lawrence Berkeley Laboratory internal report LBL-765 (1972).

J. S. Colonias, "Particle Accelerator Design: Computer Programs," Academic Press (1974) 227-32.

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

unknown

Source language: FORTRAN

Computers it runs on: CDC 6600/7600

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: MAFCO-W

Person to Contact: T. F. Yang
Address: University of Wisconsin
Madison, WI
USA

Telephone Number:

Classification of Computer Code:

Component Design:

☐ Ion Source, ☒ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:

☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MAFCO-W has been written for calculating magnetic fields of finite size conductors of general configuration which can be approximated by arc segments or straight segments of rectangular cross section. The magnetic field components were obtained by integrating the Biot-Savart law over the volume of the conductor. Their mathematical expressions were first reduced to single integration analytically and then integrated numerically. The magnetic fields for the conceptual Tokamak fusion reactors UWMAK-I and II were calculated and anlyzed.

Publications describing the code:

T. F. Yang, "Magnetic Field Code for Handling General Current-carrying conductors in 3-D," 5th Int'l Conf. on Magnet Technology in Frascati (1975), 203-9; published by Comitato Nazionale per. l'Energia Nucleare, Frascati, Italy (1975).

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Feb. 1986 Program Name: MAFIA

Person to Contact: Thomas Weiland
Address: Deutches Electronen Synchrotron (DESY)
Notkestrasse 85 d2000
Hamburg 52
Federal Republic of Germany

Telephone Number: 49-40-8998-3196

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[x] Stability, [x] Impedances, [x] Wake field effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MAFIA is a collection of codes (M3, R3, E31, E32, P3 and T3) for calculating the resonant frequencies and transient electromagnetic fields in a fully 3 dimensional geometry. M3 is the mesh generator. R3 generates the eigenvalue matrix. E31 is a "standard" eigenvalue solver. E32 is an eigenvalue solver that uses multigrid methods. P3 is a postprocessor that displays a variety of one and two dimensional plots of the fields in the cavity and also prints a variety of numerical results.

T3 is a 3D version of TBCI and is used for analyzing the electromagnetic interaction between bunched beams of charged particles and vacuum chambers containing rf cavities, bellows, etc. There are two postprocessors used with the code. W3COR subtracts the tube wake field from the total wake. W3OUT reads and prints a wake; it can calculate the gradient impedance, plot the bunch density, and normalise the wakes to [ ].

Publications describing the code:

T. Weiland, "On the Unique Numerical Solution of the Maxwellian Eigenvalue Problem in Three Dimensions," Part. Accl. 17(1985)227-42.

T. Weiland, Part. Accel. 15(1984)245-91.

T. Weiland, SLAC Linac Conf. (1986)

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

The codes are available from T. Weiland on a "friendly user" basis. Executable forms are available on Los Alamos National Laboratory computers. (For more info, contact Therese Barts (505) 667 9385.) The codes are also available on the MFE computer network. For information of the MFE access, contact Carol Tull FTS 532 1550, or Therese Barts FTS 843 0385.

Source language: FORTRAN 77

Computers it runs on: IBM 3081, CRAY, VAX

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format: EBCDIC
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☒ BITNET
☐

Network Address: MPYWEI %DHHDESY3.BITNET

Date of Latest Version: unknown

Program Name: MAGFOR

Person to Contact: W. D. Cain
Address: Oak Ridge National Laboratory
Oak Ridge, TN 37830
USA

Telephone Number:

Classification of Computer Code:

Component Design:

☐ Ion Source, ☒ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:

☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MAGFOR calculates electromagnetic fields and forces in coil systems of arbitrary geometry. The coils may be modeled by using 20-node isoparametric hexahedrons; 8-node rectangular cross-sectional straight segments; rectangular cross-sectional circular arcs; and/or filamenting circular loops. A combination of analytical and numerical integration of the Biot-Savart law for a volume distribution of current is used for calculating magnetic fields. Volumetric body forces are calculated for the 20-node isoparametric brick by numerically integrating the vector product J x B over its volume, where the magnetic field at each Gauss point is obtained by interpolating the magnetic field at the node points by using shape functions. The force is distributed to the node points of the element, again using the shape functions in a consistent manner that maintains inter-element torsion. Body forces obtained from MAGFOR were compared with body forces from the computer code EFFI for several coil configurations considered in the design of the Advanced Toroidal Facility (ATF).

Publications describing the code:

W. D. Cain, "MAGFOR: A Magnetics Code to Calculate Field and Forces in Twisted Helical Coils of Constant Cross Section," Fusion Engineering, vol. 2 (1983) 1223-1227.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language:

Computers it runs on: machine-independent

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1977

Program Name: MAGNET

Person to Contact: Program Library
Address: CERN,
DD Div
CH-1211 Geneva 23
Switzerland

Telephone Number: (22) 83 2377

Classification of Computer Code:

Component Design:

[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Magnet Design in 2 dimensions. Finite Difference Method with two Potentials.

Publications describing the code:

CERN Program Library Writeup T600

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

(Contact CERN Program Library)

Source language: FORTRAN 66

Computers it runs on: IBM CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format: 9 track 1600 bpi

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Oct. 1986

Program Name: MAGNUS

Person to Contact: Sergio Pissanetzky
Address: Texas Accelerator Center
2319 Timberloch
The Woodlands, TX 77380
USA

Telephone Number: (713)363 0121

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The MAGNUS package for 3-D magnetic field calculations consists of the preprocessor KUBIK, the MAGNUS solver, and the postprocessor EPILOG. The program employs the Finite Element Method (FEM), with a total scalar potential in regions with iron and a partial scalar potential in regions with current. The use of the total potential in iron avoids severe round off errors that would arise if a partial potential were used (small difference between large numbers). The program is interfaced with the international Graphic Kernel Systems (GKS).

The mesh generator KUBIK prompts the user to input all information describing the geometry of the problem and the desired mesh refinement. Names are also assigned to regions or materials, boundaries, etc. KUBIK is a truly 3-D mesh generator. Modules representing simple bodies, or parts of bodies, are independently defined, each with its own mesh inside. The modules are then assembled into the final 3-D structure of any degree of complexity. KUBIK runs either interactively or in batch, and accepts commands that print a variety of tables or plots.

MAGNUS has a library of solid and filament conductor elements, out of which the user can construct conductors of practically any shape in 3-D. Commands exist that will generate new conductors by displacement, reflection or rotation of existing conductors, or produce tables or plots. The independent program WIRE can be used to calculate the field of the conductors alone (no iron or boundary conditions) at any point of space. The conductors are completely independent of the mesh created by KUBIK, and can be changed without modifying the mesh. MAGNUS also has a library of magnetization tables, including several American steels and Japanese steels at different temperatures, and ideal materials such as pure iron or nickel. The user can input additional tables.

The MAGNUS solver obtains a solution in the mathematical sense: the magnetic potential given as a function of the coordinates at every point in the solution domain. A high efficiency and surprisingly short execution times are achieved by means of sophisticated programming and the use of sparse matrix techniques. The solver runs in batch for the number of iterations specified by the user, or until the desired accuracy is obtained. It generates a drop file and can be restarted if so desired.

Once the solution is available, the user runs the postprocessor EPILOG interactively on VAX. EPILOG accepts commands that will compute and print a variety of derived quantities, like % averaged harmonic

coefficients, spherical 3 D harmonic coefficients, energy, inductances, line or surface integrals of the field, etc. EPILOG can also generate tables of field, permeability, potential, etc., and a variety of plots. EPILOG is a very useful design tool for the physicist or engineer.

Accuracy is a primary consideration in the MAGNUS package. It is now known that a very important source of large errors is the inappropriate interpolation of magnetization tables. In MAGNUS, interpolation is done using the FKP interpolation relation, the most accurate known rule. Another source of inaccuracy is round-off in the calculation of the field of solid conductors. Careful mathematical/numerical techiniques have been used to rewrite the expressions in such a way that round-off will not affect the results. The accuracy, even in single precision, is better than with the usual expressions in double precision. Numerical quadrature in MAGNUS is done by Carl de Boor's method, which guarantees the final accuracy, rather than by the usual n-point Gauss formula, which is very inaccurate in many cases but extensively used in other programs.

Publications describing the code:

S. Pissanetzky, "The Interpolation of Magnetization Tables," COMPEL 5(1986)41-56.

S. Pissanetzky, "The Design of Superferric Magnets for the Superconducting Super Collider and the New Program MAGNUS for Three-Dimensional Magnetostatics," IEEE Trans. MAG-21 (1985) 2457.

S. Pissanetzky, "The New Version of the Finite Element 3D Magnetostatics Program MAGNUS," Comp. Electromagnetics (1986) 121-32, Ed. Elsevier Science Publ. B. V. (North Holland).

S. Pissanetzky, "Automatic Three-Dimensional Finite Element Mesh Generation Using the Program KUBIK," Computers Phys. Comm. 32 (1984) 245-65. (See also CPC 32 (1984) 267-71.)

S. Pissanetzky, "Sparse Matrix Technology," Academic Press, London (1984).

S. Pissanetzky, "KUBIK: An Automatic Three-Dimensional Finite Element Mesh Generator," Int. J. Num. Meth. Engng. 17(1981)255-69.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

By license agreement with Ferrari High Technology Products, P.O. Box 1866, Orange Park, FL 32067-1866.

By agreement with the Texas Accelerator Center, the code is also available free of charge to some HEP groups at National Laboratories through the MFE network.

Source language: FORTRAN IV

Computers it runs on: VAX and CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[x] NMFECC

Network Address:

Date of Latest Version: July 1986 Program Name: MAPPOT

Person to Contact: Etienne Forest
Address: MS 90/4040, URA Design Center
c/o UCLBL
Berkeley, CA 94720
USA

Telephone Number: (415) 486 6580, FTS 451-6580

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MAPPOT generates a Lie-algebraic map that produces tracking results equivalent to those produced the third-order matrix code RACETRACK. The output can be put into MARYLIE for the calculation of auxilary quantities such as chromaticity and nonlinear invariants.

Publications describing the code:

None yet.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Source language: FORTRAN 77

Computers it runs on: CRAY-XMP

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: MARTUR

Person to Contact: I. S. Baksjev
Address: Institute of High Energy Physics
Serpukhov
USSR

Telephone Number:

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: radiation loading calculations

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A set of MARTUR computer codes is created to calculate spatial distributions of high-energy proton losses in accelerator structures and arising energy release, induced radioactivity, radiation loadings on equipment and shields. The set of computer codes consists of three major codes: ESSEPT—the code for simulation of initial interaction of circulating proton beam with the energy E_O with an arbitrary "target"; TURTLM – the code for calculation of particle transport; MARSGT—the code for nuclear-electromagnetic cascade calculation, which appear in magnetic structure and due to the loss of transported fast protons.

Publications describing the code:

Bajshev, I.S.; Maslov, M.A.; Mokhov, N.V., "MARTUR Set of Computer Codes for Calculation of Particle Interactions and Transport in Proton Accelerators", All-Union Conference on Charged Particle Accelerators Proceedings vol. 2. (1983) 167–170.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Dec. 1986

Program Name: MARYLIE

Person to Contact: Alex J. Dragt
Address: Physics Department
University of Maryland
College Park, MD 20742
USA

Telephone Number: (301) 454 7324

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☒ Beam Lines and Storage Rings.

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☒ Beam Lines and Storage Rings.

Analysis:
☒ Stability, ☐ Impedances, ☐

Other: Nonlinear Orbit Behavior, aberrations

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The program employs algorithms based on a Lie-algebraic formulation of charged particle trajectory calculations, and is able to compute transfer maps for and trace rays through single or multiple beamline elements. This is done for the full 6-dimensional phase space. All nonlinearities, including chromatic effects, through third (octupole) order are included. In addition, MARYLIE is exactly symplectic (canonical) through all orders.

MARYLIE may be used both for particle tracking around or through a lattice and for analysis of linear and nonlinear lattice properties. Tracking can be performed element to element, lump to lump, or any mixture of the two. (A lump is a collection of elements combined together and treated by a single transfer map.) The speed for element to element tracking is comparable to that of other codes. When collections of elements can be lumped together to form single transfer maps, tracking speeds can be orders of magnitude faster.

MARYLIE also has powerful analytic tools. They include the calculation of first, second, and third order dispersion; tunes and first and second order chromaticities; the other linear lattice functions and their energy dependence through second order; the dependence of tune on betatron amplitude; nonlinear lattice functions; nonlinear phase-space distortion; transfer map normal forms; nonlinear resonance driving terms; and nonlinear invariants. Finally, MARYLIE can be used to give an explicit representation for the linear and nonlinear properties of the total transfer map of a system. This information can be used to evaluate or improve the optical quality of a single pass system such as a beam transport line or linear collider. MARYLIE 3.0 running (in double precision) on a VAX 11/785 requires 140K bytes of memory, and can evaluate (track) approximately 25 maps per second.

A vectorized version running on a CRAY X MP (in single precision and using only one processor) requires 212K words of memory, and can evaluate approximately 4000 maps per second.

Publications describing the code:

D. R. Douglas, "Lie Algebraic Methods for Particle Accelerator Theory," Ph.D. thesis, Univ. Md. (1982) unpublished.

Alex J. Dragt, Robert D. Ryne, Liam M. Healy, Filippo Neri, David R. Douglas, Etienne Forest, "MARYLIE 3.0, A Program for Charged Particle Beam Transport Based on Lie Algebraic Methods."

David R. Douglas and Etienne Forest, "A Program for Nonlinear Analysis of Accelerator and Beamline Lattices," IEEE Trans. NS-32 (1985) 2311.

Is code documentation available? ☒ Yes ☐ No

How may the code be obtained?

From Maryland when released.

Source language: FORTRAN 77

Computers it runs on: CRAY, IBM, VAX UNIVAC, CDC.

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☒ ARPANET, ☒ BITNET
☐

Network Address: dragt@umcincom

Date of Latest Version: unknown

Program Name: MASK

Person to Contact: Adam Drobot
Address: SAI
1710 Goodridge Dr.
McLean, VA 22102
USA

Telephone Number:

Classification of Computer Code:

Component Design:
☒ Ion Source, ☐ Magnet, ☐ RF cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The MASK code is a 2-1/2 dimensional particle-in-cell code which has been applied to the simulation of a number of microwave devices. It has been used to simulate klystrons and other electron accelerator components.

Publications describing the code:

Eppley, K.; Brandon, S.; Drobot, A.; Hanerfeld, H.; Herrmannsfeldt, W.; Melendez, R.; Nielsen, D.; Yu, S., "Results of Simulations of High-power Klystrons," Proc. of Part. Accl. Conf. published in Trans. IEEE NS-32 (1985) 2903–2905.

Yu, S. S.; Drobot, A.; Wilson, P., "Two and One-half Dimension Particle-in-cell Simulation of High-power Klystrons," Proc. of Part. Accl. Conf. published in Trans. IEEE NS-32 (1985) 2918–2920.

Hanerfeld, H., "Computational Needs for Modelling Accelerator Components," SLAC internal report, SLAC-PUB-3708.

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

From Adam Drobot. (The code may also be available from SLAC, for instance from W. Herrmansfeldt.)

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: July 1986 Program Name: MATRACE

Person to Contact: Etienne Forest
Address: MS 90/4040
URA Design Center
c/o UCLBL
Berkeley, CA 94720

Telephone Number: (415) 486-6580, FTS 451-6580

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MATRACE can be used as a postprocessor to the code RACETRACK. It will generate up to third-order matrices for variables (x, x', y, y') that give equivalent tracking results for the full ring relative to a given trajectory. This is useful for studying misalignments. The output of MATRACE can be put into MARYLIE, which can generate such quantities as chromaticity and non-linear invariants.

Publications describing the code:

E. Forest, "Lie Algebraic Maps and Invariants Produced by Tracking Codes," SSC Design Group internal report SSC-78 (1986).

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Call Etienne Forest.

Source language: FORTRAN

Computers it runs on: VAX, CRAY-XMP

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: As desired.
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Dec. 1985

Program Name: MEBT

Person to Contact: C. T. Mottershead
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-9730 FTS 843-9730

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: Beam Diagnostics

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MEBT = Maximum Entropy Beam Tomography. Intense particle beams require noninterceptive diagnostics. One of these is the light emitted from interaction of the beam with residual gas. If the light is produced by a first-order process linear in the beam density, its profile measured across the beam may be interpreted as a tomographic projection of that density distribution. With a small number of such projections, and appropriate transfer matrices connecting them, Minerbo's maximum entropy (MENT) algorithm may be used to construct an estimate of the beam density distribution in both coordinate and phase space. This MENT algorithm is running as part of an integrated software system on an LSI 11/23 mounted in the same diagnostic node where the data is recorded. The solution usually converges in about 5 iterations, each of which takes a few seconds in the typical case of 3 or 4 views of 25 samples each. The subroutine implementing the MENT algorithms are being rewritten to make them portable

Publications describing the code:

C. T. Mottershead, "Maximum Entropy Beam Diagnostic Tomography," IEEE Trans. NS-32 (1985) 1970.

G. N. Minerbo, "MENT: A Maximum Entropy Algorithm for Reconstructing a Source from Projection Data," Comp. Graphics Image Proc., 10 (1979) 48.

O. R. Sander, G. N. Minerbo, R. A. Jameson, and D. D. Chamberlin, "Beam Tomography in Two and Four Dimensions," Proc. 1979, Linac Conf. Brookhaven National Laboratory report BNL 51134 (1980).

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Contact Tom Mottershead.

Source language: FORTRAN

Computers it runs on: PDP11 & VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: ctm@lanl.arpa

Date of Latest Version: 1961 Program Name: MESSYMESH

Person to Contact: T. W. Edwards
Address: unknown

Telephone Number:

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This code was the first serious attempt to use numerical methods for the design of rf cavities. It is obsolete.

Publications describing the code:

T. W. Edwards, MESSYMESH Programs for calculations for linear accelerator cavities. MURA, Midwestern Universities Research Assoc., No. 642, Stoughton, Wisconsin, (1962).

T. W. Edwards, Proton linear accelerator cavity calculations. MURA, Midwestern Universities Research Assoc., No. 622, Stoughton Wisconsin, (1961).

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language: FORTRAN

Computers it runs on: IBM 360

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Dec. 1985 Program Name: MICADO

Person to Contact: Yolande Marti
Address: LEP Theory Division
CERN
1211 Geneva 23
Switzerland

Telephone Number: (022) 832948

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, [x] Error correction and closed orbit correction.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MICADO is a solver of rectangular systems of linear equations. It is recommended for over-determined systems (more equations than unknowns) The solution is iterative and gives at each iteration the most efficient solutions to reduce the norm of the residual vector. It has been extensively tested for orbit correction. A recent application has been made to dynamic aperture correction.

Publications describing the code:

B. Autin and Y. Marti, "Closed orbit correction of A. G. machines using a small number of magnets," CERN/ISR-MA/73-17.

G. Guignard, Marti, "PETROC users' guide," CERN ISR-BOM-TH/81-32

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact LEP Division

Source language: FORTRAN 77

Computers it runs on: IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: unlabeled, 1600 Bpi, 3200 char/block, 80 char/record
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: MAR at CERNVM.

Date of Latest Version: Jan. 1986

Program Name: MIRKO

Person to Contact: Bernhard J. Franczak
Address: c10 GSI
Postfach 110541
D-8100 Darmstadt-11
Fed. Rep. Germany

Telephone Number: 49 6151-359370

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☒ Beam lines

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☒ Beam lines

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Purpose: Design of synchrotrons and beam lines, optimization of focusing elements in first order.

Algorithms: Linear matrix formalism for transformation of ellipses and single particles; tracking of single particles through linear matrices and thin non-linear lenses representing multipoles.

Special features:

Interactive operation employing a command structure.

Graphic output of envelopes, ellipses, and particle distributions.

On-line help available

Interactive graphics using the cursor

Detailed investigation of non-linearities in synchrotrons.

Publications describing the code:

B. Franczak, "MIRKO - An Interactive Program for Beam Lines and Synchrotrons," Conf. on Computing in Accelerator Design and Operation, Berlin (W) (1983) 170.

Springer Verlag (1984)

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact author

Source language: FORTRAN 77

Computers it runs on: VAX, IBM

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☒ Networks
Tape format: as needed
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☒ EARN

Network Address: PT01 at DDAGSI3

Date of Latest Version: 1983 Program Name: MISAR

Person to Contact: Donald A. Swenson
Address: SAI
505 Marquette N.W., Suite 1200
Albuquerque, NM 87102
USA

Telephone Number: (505) 247-8787

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Accumulator Rings

Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MISAR is a PARMILA-like multiparticle simulation code that follows the transverse coordinates of a collection of macroparticles from the inflector, around the lattice of a circular machine, incorporating the space-charge forces of the beam as modified by the image effects in the walls, for a number of turns. No longitudinal structure in the beam is allowed. After each turn around the machine, the number of particles in the "beam" is increased by the addition of a new quantity of beam from the inflector. Provisions are made for time-dependent pulsed bumps that can move the equilibrium orbit in the vicinity of the inflector to establish the multiturn injection process. As in PARMILA, there are a variety of options for generating the initial coordinates of the inflected beam and a variety of options for displaying the properties of the accumulated beam. The space-charge effects are supplied by a SCHEFF subroutine, which is called one or more times during each basic period of the lattice.

Publications describing the code:

D. A. Swenson and K. R. Crandall, "MISAR: A Particle Tracking Code for Multiturn Injection Studies in Accumulator Rings," Proc. of Workshop on Accelerator Orbit and Particle Tracking Programs, Brookhaven 1982, Brookhaven Internal Report BNL-31761. Also Los Alamos Report LA-UR-82-1585.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Los Alamos Accelerator Code Group. (Call John Warren at (505) 667-6677 (or 667-2839), FTS 843-6677)

Source language: FORTRAN

Computers it runs on: CDC 7600

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: lks@lanl.arpa

Date of Latest Version: 1979 Program Name: MOTER

Person to Contact: Edward A. Heighway
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-1543, FTS 843-1543

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, RF-cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam lines, mass spectrometers

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MOTER is a ray tracing program intended for analysis and optimization of a system of magnetic elements. Several features are included in MOTER which are not available in other codes. Among these are Monte Carlo simulation of the beam phase space, a sophisticated definition of the performance including the possibility of computer correction of aberrations based on measurements of the trajectory of each event, the automatic optimization of any parameter of the magnet system, the possibility of the use of field maps for dipoles, quadrupoles, and multipoles, and the availability of several new element types including an ExB separator, an r.f. accelerating gap, a wedge degrader, and various slits and scatterers. To the greatest possible extent, MOTER makes use of the definition of parameters identical to program RAYTRACE from which it evolved. In order to minimize the pitfalls of problem setup, it is suggested that the MOTER user first study his problem with the standard codes TRANSPORT, TURTLE, and RAYTRACE, in that order.

Publications describing the code:

H. A. Thiessen and M. Klein, "Design of Mass Spectrometer at LASL," NTIS CONF-7209208, Proc. IV Int'l Conf. on Magnet Technology, Brookhaven National Laboratory (1972) 8.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact the Los Alamos Accelerator Code Group (505) 667-6677 (or 667-2839), FTS 843-6677.

Source language: FORTRAN

Computers it runs on: VAX, CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hks@lanl.arpa

Date of Latest Version: Apr. 1986 Program Name: MOTION

Person to Contact: Klaus Bongardt, ASI
Address: KFA Jülich
Postfach 1913
D-5170 Jülich,
Fed. Rep. Germany

Telephone Number: (02461)61 3544

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam lines

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Macroparticle tracking code, non-relativistic, integrates equations of motion through any user-defined external (electric and/or magnetic) field. Built-in components: quadrupoles, solenoids, dipoles, bunching cavities, octupoles, rf gaps. Full 3D space charge. No edge focusing in dipole magnets. Initial distributions available: 4D waterbag, 4D K-V, user defined. Highly specialized and time consuming. Good for design and analysis of low-energy beam lines.

Publications describing the code:

"MOTION A Versatile Multiparticle Simulation Code" by K. Mittag and D. Sanitz, Proc. 1981 Linac Conference, Los Alamos Report LA-9234-c, 156–158.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Klaus Bongardt.

Source language: FORTRAN 77

Computers it runs on: CRAY, IBM 3081

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: MULTIMODE

Person to Contact: A. I. Fedoseyev or V. V. Gusev
Address: Institute for High Energy Physics,
Serpukhov,
Moscow region,
USSR

Telephone Number:

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☒ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The MULTIMODE code is used for computing the lowest eigenfrequencies and electromagnetic fields in homogeneous waveguides and axially symmetric cavities. Eight-node isoparametric finite elements are used, which give the exact approximation of curvilinear region boundaries and high accuracy in computations of frequencies on a small number of grid nodes. The comparison of MULTIMODE with other programs shows that MULTIMODE attains the same accuracy while running 10-100 times faster. The program allows the computation of both simple and degenerate frequencies.

Publications describing the code:

"MULTIMODE - A Powerful Code for Frequency Spectrum Computation of Electromagnetic Fields in Axially Symmetric Cavities and Longitudinally Homogeneous Waveguides of Arbitrary Shape," Nuclear Instru. & Methd. 227 (1984) 411-19.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1980

Program Name: NAJO

Person to Contact: J. Sauret or A. Chambert
Address: GANIL
Boite Postal 5027
F. 14000 CAEN
France

Telephone Number: 31.45.46.47

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☒ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This is a general multiparticle code developed for studying particle motion in cyclotrons. Related to the structure of the GANIL separated-sector cyclotrons, it could be adapted to other configurations.

Its main limitation comes from the shape of the accelerating gaps which are presently restricted to radial ones. Accelerating field effects are expressed as kicks applied at the gap centers allowing for a complete decoupling in the treatment of the magnetic and electric fields.

Simplified versions have been derived, restricted either to the median plane (JOAN) or to a single particle in this plane (ANJO). In its most general version the code takes into account space charge effects. A more precise description of these codes including listings and examples is given in the internal report listed below.

Publications describing the code:

J. Sauret, A. Chabert and M. Prome, "Multiparticle Codes Developed at GANIL," in the Proc. of the Conf. on "Accelerator Design and Operation" Berlin (1983) 164-9, Springer-Verlag, 1984.

Le Groupe Theorie Parametres, "Les Programmes ANJO, JOAN, NAJO," GANIL Internal Report 80R/132/TP/06.

Is code documentation available? ☒ Yes ☐ No

How may the code be obtained?

J. Sauret or A. Chambert

Source language: FORTRAN

Computers it runs on: UNIVAC 1108, (MODCOMP in the near future)

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☒ Listing, ☒ Tape, ☒ Diskette, ☐ Cards, ☐ Networks

Tape format: 1600 BPI

Diskette size & format: IBM.32.70

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: 1983 Program Name: OPTIC II

Person to Contact: Joe Tesmer
Address: MS K764, Group P-10
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-6370, FTS 843-6370

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Electrostatic Accelerator

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Electrostatic Accelerator

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Early program used for beam optics in electrostatic accelerators. Good treatment of accelerating tubes and strippers. Time dispersion treatment of bunched beams.

Custodian: J. D. Larson, 10011 E 35th Terr., Independence, MO 64052

Based on code by T. J. Devlin (UCRL-9727)

Publications describing the code:

T. J. Deubin, Univ. of California Internal Report UCRL 9727

S. Penner, "Calculations of Properties of Magnetic Deflection Systems," Rev. Sci. Inst. 32 (1961) 150.

J. D. Larson, "New Developments in Beam Transport Through Tandem Accelerators," Nuclear Inst. and Methods, 122 (1974) 53 63.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Joe Tesmer.

Source language: FORTRAN

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: As desired.
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: OSCAR2D

Person to Contact: Paolo Fernandez
Address: Instituto per la Matematica Applicata
Consigilo Nazionale delle Ricerche
Via L. B. Alberti, 4
16132 Genova, ITALY

Telephone Number: unkown

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☒ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This is a 2-D rf cavity code. (No more information available at this time)

Publications describing the code:

unknown

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Nov. 1985 Program Name: PANDIRA GROUP CODES

Person to Contact: Los Alamos Accelerator Code Group
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-9131 or 667-2839, FTS 843-9131

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Calculates static magnetic field in two cartesian dimensions or cylindrically symmetric configurations in 3D. Handles permanent magnet materials as well as permeable iron and current carrying coils. Can solve ferroelectric problems also. Uses the "direct" method to solve the 2D, generalized POISSON equation. Included in the group of codes is AUTOMESH, LATTICE, and FORCE.

Publications describing the code:

K. Halbach, "Design of Permanent Multipole Magnets with Oriented Rare Earth Cobalt Materials," Nucl. Inst. and Meth., 169 (1980) 1-10

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Send blank tape to above address; specifying version desired (VAX or CRAY). Also available through ARPANET, DECNET or BITNET; telephone for instructions.

Source language: FORTRAN 77

Computers it runs on:

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 track, 1600 bpi, 80 char/line
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hks@lanl.arpa

Date of Latest Version: 1986

Program Name: GIOS

Person to Contact: H. Wollnik
Address: II. Physikal Institut
Heinrich Buffring 14-16
6300 Giessen,
Fed. Rep. Germany

Telephone Number: 641-702-2770

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF cavity, ☐

Accelerator Optimization:
☐ Linac, ☒ Cyclotron, ☒ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☒ Cyclotron, ☒ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: Design of Mass Spectrometers and electromagnetic transport lines

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Third order matrix method, usual beam line elements + fringe field approximation, fitting capabilities, space charge approximation.

Publications describing the code:

H. Wollnik, J. Brezina and M. Berz, "GIOS BEAMTRACE, a Program for the Design of High Resolution Mass Spectrometer," 2nd Intl. Conf. on Char. Part. Optics, Albuquerque, May 19-23, 1986. NIM (To be published).

(GSI Report THD 26 Darmstadt (1984)).

Is code documentation available? ☒ Yes ☐ No

How may the code be obtained?

Contact above address

Source language: Fortran

Computers it runs on: VAX, Cyber

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☒ Diskette, ☐ Cards, ☒ Networks
Tape format: as desired
Diskette size & format: as desired

Available through: ☐ DECNET, ☐ ARPANET, ☒ BITNET
☐

Network Address: ug21%ddngsi3@bitnet

Date of Latest Version: unknown

Program Name: GO

Person to Contact: Hamid Shoaee
Address: SLAC
P.O. BOX 4349, SLAC Bin 26
Stanford, CA 94305
USA

Telephone Number: (415) 854-3300 ext. 2954, FTS 461-9300 ext. 2954

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: An executive program.

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

GO is an executive program placed on the PEP group's public disk (PUBRL 192) to facilitate the use of several PEP related computer programs available on VM. The exec's program list currently includes: CELL, COLLIDER, MAGIC, PATRICIA, PETROS, TRANSPORT, and TURTLE. In addition, provisions have been made to allow addition of new programs to this list as they become available. The GO exec is directly callable from inside the Wylbur editor (in fact, currently this is the only way to use the GO exec.) It provides the option of running any of the above programs in either interactive or batch mode. In the batch mode, the GO exec sends the data in the Wylbur active file along with the information required to run the job to the batch monitor (BMON, a virtual machine that schedules and controls execution of batch jobs). This enables the user to proceed with other VM activities at his/her terminal while the job executes, thus making it of particular interest to the users with jobs requiring much CPU time to execute and/or those wishing to run multiple jobs independently. In the interactive mode, useful for small jobs requiring less CPU time, the job is executed by the user's own Virtual Machine using the data in the active file as input. At the termination of an interactive job, the GO exec facilitates examination of the output by placing it in the Wylbur active file.

Publications describing the code:

Shoaee, H., "GO, an Exec for Running the Programs: CELL, COLLIDER, MAGIC, PATRICIA, PETROS, TRANSPORT And TURTLE," SLAC internal report No. PEP-NOTE-369 (1982) 8p.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language:
Computers it runs on:
It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: PAQUASEX

Person to Contact: S. Kheifets
Address: Stanford Linear Accelerator Center
Stanford University,
Stanford, CA 94305
USA

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PAQUASEX is essentially a combination of the three codes PATRICIA, QUADS, and MICROSEX. The system is designed to do a configuration survey over a grid of points in the space of main configuration parameters ν_x, ν_y, β_x^*, β_y^* and η_x^* (the star means the value of a parameter at the interaction point).

The system starts by preparing with the help of PATMOD input data decks for QUADS and MICROSEX, i.e. target values of desired parameters. One option prepares a deck for a grid of 5x5 points in ν_x, ν_y space. The other option prepares five sets of five points. Each set of five points are increments in one of the five above mentioned parameters (keeping all others fixed). These options are selected by means of the control code number KW(16).

Publications describing the code:

S. Kheifets, "Tracking Studies in PEP and Description of the Computer Code PATRICIA," in Proc. Workshop Orbit and Particle Tracking Programs at BNL, (1982) BNL informal report BNL-31761.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: July 1986

Program Name: PAR2DOPT

Person to Contact: Gerry Morgan
Address: Brookhaven National Lab.
Bldg. 902B
Upton, Long Island, NY 11973
USA

Telephone Number: (516) 282-4841, FTS 666-4841

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PAR2DOPT is used in the optimization of coil placement of circular cross section magnets of the type used in the design of SSC magnets. It optimizes the azimuthal position and tilt of layered turns and the number of turns per block. The layers of turns need not be fully keystoned, but can be shimmed with wedge-shaped material. The code can be run with or without infinite permeability iron surrounding the coils. The optimizer is based on the CERN code MINUIT. It has some Tektronics 4010-based graphics output. The code is still in the development stage and has no documentation.

Publications describing the code:

None. The authors of the present code include Richard Fernow, Gerry Morgan and Patrick Thompson. Shlomo Caspi at LBL has a copy.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Call Gerry Morgan.

Source language: FORTRAN

Computers it runs on: VAX, CDC 7600

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: whatever
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Apr. 1985

Program Name: PARMELA

Person to Contact: Lloyd M. Young
Address: MS H817, Group AT-1
Los Alamos National Laboratory
Los Alamos NM 87545
USA

Telephone Number: (505) 667 1951, FTS 843-1951

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [x]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMELA means Phase And Radial Motion in Electron Linear Accelerators. It is a variation of PARMILA that applies to standing wave electron linacs and transport lines. The user must supply the linac structure and the fields in the basic rf cell. Multiparticle tracking is done with space charge forces. The independent variable is time, as opposed to distance along the beam line, which is used in the ion version PARMILA. The code was written by Ken Crandall. The code will generate several types of input electron distributions. The output is a file of particle distribution in 6D phase space at the exit of each rf cell. There is a postprocessor called PARGRAPH which will make "phase space scatter plots". The code is partially documented.

Publications describing the code:

None

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Contact Lloyd Young

Source language: FORTRAN

Computers it runs on: CDC7600, CRAY-1

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [x] Diskette, [ ] Cards, [x] Networks
Tape format: as desired
Diskette size & format: 5 1/4" IBM PC

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hks@lanl.arpa

Date of Latest Version: Jan. 1986 Program Name: PARMILA

Person to Contact: Los Alamos Accelerator Code Group
Address: MS H829, Group AT-6,
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-6677 or 2839, FTS 843-6677

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]
Accelerator Optimization:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] transport lines

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] transport lines

Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMILA means Phase And Radial Motion in Ion Linear Accelerators. Given the electric and magnetic fields in one rf cavity and the gap-length-to-cell-length function for the cavity design from a code like SUPERFISH, PARMILA will generate the layout for a multicell DTL. It also does multiparticle tracking with space charge through the linac or through a transport line. There are several choices of input particle distributions: KV, Gaussian, waterbag, uniform, rectangular and experimental data. The default space charge subroutine assumes a circular beam and makes the impulse approximation once per rf cell. Other subroutines can be substituted if desired. The output is a file with the phase space distribution at the exit of each rf cell. There is a postprocessor called OUTPROC that will plot beam profiles as a function the beam direction z and particle distribution for cross sections of phase space, e.g. (x, x'), (y, y'), (φ, E), etc. OUTPROC also calculates moments of the distribution. The code is partially documented.

Publications describing the code:

None

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact The Los Alamos Accelerator Code Group

Source language: FORTRAN

Computers it runs on: CDC 7600, CRAY-1

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 track, 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET

Network Address: lks@lanl.arpa

Date of Latest Version: Jan. 1986 Program Name: PARMTEQ (B or C)

Person to Contact: The Los Alamos Accelerator Code Group
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 6677 or 2839, FTS 843 6677

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMTEQ is a version of PARMILA that will generate a design for an RFQ ion accelerator and also do multiparticle tracking with space charge through the linac. To do the design layout the program needs the output of two codes RFQIK and CURLY, described elsewhere. There are several types of input distributions available.

In PARMTEQ(B) Z (distance along the beam) is the independent variable. In PARMTEQ(C) time is the independent variable. The output is a file of particle distributions over 6D phase space at the end of each RFQ "cell." There is a post processor called OUTPROC that will calculate moments, make phase space plots and beam profiles.

Publications describing the code:

None

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Call The Los Alamos Accelerator Code Group

Source language: FORTRAN

Computers it runs on: CDC 7600, CRAY 1

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 Track 1600 bpi in almost SSX format
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hks@lanl.arpa

Date of Latest Version: 1984 Program Name: PATH

Person to Contact: Los Alamos Accelerator Code Group
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 6677 (or 667 2839), FTS 843 6677

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam Transport.

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PATH is a group of computer programs for simulating charged-particle beam-transport systems. It was developed for evaluating the effects of some aberrations without a time-consuming integration of trajectories through the system. The beam-transport portion of PATH is derived from the well-known program DECAY TURTLE. PATH contains all features available in DECAY TURTLE (including the input format) plus additional features such as a more flexible random-ray generator, longitudinal phase space, some additional beamline elements, and space-charge routines. One of the programs also provides a simulation of an Alvarez linear accelerator. The programs, originally written for a CDC 7600 computer system, also are available on a VAX/VMS system. All of the programs are interactive with input prompting for ease of use.

Publications describing the code:

John A. Farrell, "PATH — A Lumped Element Beam Transport Simulation Program with Space Charge," Proc. of Berlin Conf. on Computing in Accel. Design and Operation," W. Busse and R. Zelazny ed., Springer Verlag, Berlin (1984) 267.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact the Los Alamos Accelerator Code Group.

Source language: FORTRAN

Computers it runs on: VAX, CDC 7600

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 Track 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET

Network Address: lbl-csa.arpa

Date of Latest Version: July 1986

Program Name: PATPET

Person to Contact: Helmut Wiedemann
Address: Stanford Synchrotron Radiation Laboratory
BIN #69
P.O. Box 4349,
Stanford, CA 94305

Telephone Number: (415) 497-2503, FTS 461-9300 ext 2503

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedance [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PATPET is a combination of PATRICIA and PETROS. It is a tracking program that takes into account multipoles, systematic field errors, and misalignments. It produces dynamic apertures in one run based on tracking 400 particles.

Publications describing the code:

Users' Guide (draft).

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Contact Helmut Wiedemann.

Source language: FORTRAN

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [x] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format: 8" Floppy.

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address: SSRL750

Date of Latest Version: unknown

Program Name: PATRAC

Person to Contact: A. Hilaire
Address: LEP Theory Div.
CERN
1211 Geneva 23
Switzerland

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PArticle TRACking is a tracking program using a magnet matrix formalism for elements up to quadrupoles and thin lens approximation for multipoles up to 12 poles. The magnet matrices are similar to those used of the code AGS but have been extended to allow rotated magnets and hence coupled motions.

Publications describing the code:

P. Fougeras, A. Hilaire and A. Warman, "PATRAC: Particle Tracking Program," Proc. of Workshop on Accelerator Orbit and Tracking Programs, Brookhaven, Brookhaven National Laboratory Informal Report BNL-317 (1982).

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: PATRICIA

Person to Contact: S. Kheifets
Address: Stanford Linear Accelerator Center
Stanford, CA 94305
USA

Telephone Number:

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The program does the following calculations: a) It adjusts horizontal and vertical chromaticities to the values prescribed by the user. b) It calculates Twiss parameters and eta functions of the lattice. c) It calculates emittances of the beam and relevant parameters of the ring. d) It performs harmonic analysis of the particle motion and produces its frequency spectrum. e) It tracks up to four particles simultaneously through up to one thousand revolutions. The oscillations in all three degrees of motion can be included into calculations, but horizontal and vertical motions are treated independently (no coupling is taken into account besides that which appears from the passage of a displaced particle through a sextupole). In all these calculations usual (3x3) matrix formalism is used. Sextupoles are treated in thin lens approximation. PATRICIA does not fit parameters of a linear lattice. The program uses the lattice which is supplied to it and attempts to find a periodic solution for the Twiss parameters and the dispersion function. If no periodic solution can be found for the on-momentum particle, the program stops. To investigate the influence of higher multipole fields in different elements of a machine, an optional version of PATRICIA under the name PNWM can be used. The action of the nonlinear field in a given element is approximated by an effective integrated nonlinear "kick". The longitudinal position of the kick is at the discretion of the user.

Publications describing the code:

S. Kheifets, "Tracking Studies in PEP and Description of the Computer Code PATRICIA," SLAC-PUB-2922 or BNL-31761 (1982) 89.

G. F. Dell, "Studies of the Chromatic Properties and Dynamic Aperture of the BNL Colliding Beam Accelerator," IEEE Trans. NS 30 (1985) 2469.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language: PASCAL

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: unknown

Program Name: PATTV

Person to Contact: John M. Jowett
Address: LEP Division
CERN
CH-1211 Geneva 23
Switzerland

Telephone Number: (022) 83 66 43 or 83 50 86

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PATTV is a version of H. Wiedemann's PATRICIA program which has been used at CERN since 1982. The main modification of the program was to provide high quality graphics via the CERN GD3 package. It is possible to watch animated "movies"of the particle motion on a terminal screen. Some additional analysis of particle power spectra is included.

Publications describing the code:

J. M. Jowett,"A Method for Distinguishing Chaotic from Quasi-periodic Motions in Orbit Tracking Programs," in Computing in Accelerator Design and Operation edited by W. Busse and R. Zelasny, Springer-Verlag, Berlin (1984) pp.261-6.

J. M. Jowett,"A New IBM Version of the Program PATRICIA," CERN LEP Theory Note No.1 (1982).

J. M. Jowett,"An easy way to run PATTV (PATRICIA)," CERN LEP Theory Note No.16 (1983).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact J. M. Jowett

Source language: FORTRAN 77

Computers it runs on: IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] JANET, [x] BITNET
[x] EARNET, etc.

Network Address: JOWETT at CERNVM

Date of Latest Version: Dec. 1985 Program Name: PETROC

Person to Contact: Gilbert Guignard or Yolande Marti
Address: LEP Division
CERN
1211 GENEVA 23
Switzerland

Telephone Number: 41-22-83.59.75

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☒ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☒ Closed Orbit Distortion.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

It computes betatron and dispersion functions, synchrotron frequency. It calculates the radiation integrals, damping partition numbers, beam emittances, bunch length and energy spread. The effect of given or random distortions (misalignments) on the closed orbit and betatron motion is determined (with or without radiation losses). Different algorithms for correcting the orbit are included (amplitude mininization, successive bumps, iterative method using a small number of correctors).

Publications describing the code:

G. Guignard and Y. Marti, "PETROC Users' Guide," CERN Internal Report, CERN/ISR-BOM-TH/81-32

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact G. Guignard or Y. Marti

Source language: FORTRAN 77

Computers it runs on: IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: Unlabeled tape, 1600 Bpi, 3200 char/block, 80 char/record
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: MAR@CERNVM.

Date of Latest Version: unknown

Program Name: PETROS

Person to Contact: K. Steffen
Address: DESY
Notkestrasse 85
2000 Hamburg 52
Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[x] Stability, [ ] Impedances, [x] Orbit Correction

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A computer program which simulates effects of possible error sources on the beam optics and the improvements due to orbit correction is a necessary tool for the study and design of large electron rings. Such a program called 'PETROS' exists at the DESY laboratory. PETROS can work in two modes: 1. Uncoupled transverse motions are assumed and the usual three-dimensional matrices are used in each plane. 2. Coupled transverse motions are considered and five-dimensional matrices are used throughout. It treats non linear fields and effects of the radiation losses due to bending. It computes the linear transformation matrices of a ring structure, the corresponding betatron and dispersion functions, betatron and synchrotron frequencies. It calculates the five synchrotron radiation integrals, the damping partition numbers, the damping times, the length devintion of off-momentum orbits, beam emittances, bunch length, relative energy spread and synchrotron lifetime, the effect of prescribed or random distortions, taking into account the radiation losses due to bending. It simulates closed orbit corrections and gives the corresponding kick amplitudes.

Publications describing the code:

K. Steffen and J. Kewish, "Study of Integer Difference Resonance in Distorted PETRA Optics," DESY PET 76/09 (1976)

B. Zotter, "A Short Guide for the Use of Program PETROS at CERN," CERN report LEP-70/37 (1978).

G. Guignard and Y. Marti, "Numerical Simulations of Orbit Correction in Large Electron Rings," Proc. of Conference on Computing in Accelerator Design and Operation, Berlin 1983, Springer Verlag, Berlin, Lecture Notes in Physics No. 215, (1984).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Unknown (Seems to be available from DESY as PETROS and from CERN as PETROC)

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Oct. 1985 Program Name: PE2D

Person to Contact: John S. Whitney
Address: Vector Fields, Ltd
Osney Mead
Oxford OX2 OEE
England

Telephone Number: 0865 248236

Classification of Computer Code:

Component Design:

[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] trajectory calculations in 2D

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PE2D is a 2D code for the analysis of magnetostatic or electrostatic fields and steady state and transient eddy currents. It can be used for a wide range of applications including fusion and accelerator magnets, electron beam lenses, non-destructive testing, actuators, and MRI magnet shielding.

PE2D enables the solution of the partial differential equation governing a system to be computed using the finite element method. The packaged pre processor provides powerful tools to aid data input.

The design requiring analysis is defined as an assembly of simple primitives, for example curvilinear quadrilaterals, which are then automatically subdivided by the program. The simple primitives have symmetry properties and may be replicated by rotation, reflection and translation. Using these features together with the copy and modify facilities, it is easy to model even the most complex geometry.

The geometric primitives have assigned material properties. These may be material constants such as permeability, conductivity and current density. Material properties can be specified as tables of function values.

PE2D uses either first or second order triangular finite elements. The first order solution can be used to obtain a fast test of the model before solving to higher accuracy using second order elements.

There are three analysis programs provided with PE2D:

Static fields (non linear and laminated materials)

Transient fields (non linear)

Steady state alternating current fields (linear)

The post processor provides extensive facilities for presentation and display of the results. These include potentials, fields and forces.

State-of the art error analysis and display provide the user with information necessary for improving the input data to achieve the necessary accuracy in an economical way.

Publications describing the code:

N. J. Diserens, "A Space Charge Beam Option For The PE2D And TOSCA Packages," IEEE Trans. MAG-18 (1982) 362-366.

Data Sheet Ref: 118522 from Vector Fields

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

By license agreement with Vector Fields, Ltd

Source language: FORTRAN 77

Computers it runs on: PRIME, VAX, IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: As required
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[x] DOE Network

Network Address: Contact Bob Lari - Argonne National Laboratory (312)972 6632

Date of Latest Version: unknown

Program Name: PINWHEEL

Person to Contact: E. R. Close
Address: 1 Cyclotron Road
Lawrence Berkeley Laboratory
Berkeley, CA 94720
USA

Telephone Number: (415) 486 6166, FTS 451 6166

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [x] Cyclotron, [ ] Synchrotron, [x] Spectrometer

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PINWHEEL was used for tracking orbits of charged particles in a combined electric and magnetic field. Runge-Kutta integration is used to solve the first-order Hamilton's equations of motion. The program has 3 parts: control, plotting and integration.

Publications describing the code:

M. Reiser and J. Kopf, "Electrolytic Tank Facility and Computer Program for Central Region Studies for the MSU Cyclotron," Michigan State University report MSUCP-19 (1964).

E. R. Close, "PINWHEEL — Orbit Tracking in Combined Electric and Magnetic Fields," Lawrence Berkeley Laboratory Report TT BKY PINWEL (1964).

John S. Colonias, "Particle Accelerator Design: Computer Programs," Academic Press, New York (1974) 246.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown, probably unavailable.

Source language: FORTRAN IV

Computers it runs on: CDC 6600 7600

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: 1985 Program Name: PISCES

Person to Contact: Yoshihisa Iwashita
Address: Institute for Chemical Research
Kyoto University
Torii-cho, Awataguchi
Sakyo-ku, Kyoto 606,
JAPAN
Telephone Number: Unknown

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A new code, PISCES, has been developed for calculating a complete set of rf electromagnetic modes in an axisymmetric cavity. The finite-element method is used with up to third-order shape functions. Although two components are enough to express these modes, three components are used as unknown variables to take advantage of the symmetry of the element matrix. The unknowns are taken to be either the electric field components $\mathbf{E}$ (E_r, E_ϕ, E_z) or the magnetic field components $\mathbf{H}$ (H_r, H_ϕ, H_z). The zero-divergence condition is satisfied by the shape function within each element.

Publications describing the code:

Y. Iwashita, "Calculation of RF Fields in Axisymmetric Cavities," Los Alamos National Laboratory report LAUR 85-1892.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Contact author.

Source language: FORTRAN

Computers it runs on: VAX 780

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1980 Program Name: POISCR

Person to Contact: Program Library
Address: DD Div
CERN
CH - 1211 Geneva
Switzerland

Telephone Number: (22) 83 2377

Classification of Computer Code:
Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Magnet design in 2 dimensions.

Finite-element method, triangular mesh.

Also for various scalar potential distributions.

Publications describing the code:

CERN Program Library Writeup T602

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

CERN Program Librarian

Source language: FORTRAN 77

Computers it runs on: IBM/CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: 9 track 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Nov. 1985 Program Name: POISSON GROUP CODES

Person to Contact: Los Alamos Accelerator Code Group
Address: MS H829, Group (AT-6)
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 9131 (or 667 2839), FTS 843 9131.

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Calculate static magnetic fields in two cartesian dimensions or cylindrically symmetric configurations in 3D. Will handle problems with permeable iron, but not permanent magnets. Can also solve electrostatic problems. Uses over-relaxation method to solve 2D generalized Poisson equation. Included in the group of codes is AUTOMESH, LATTICE, FORCE, and MIRT. MIRT is an optimization code.

Publications describing the code:

K. Halbach, "A Program for Inversion of System Analysis and Its Application to the Design of Magnets," Proc. 2nd Conf. on Magnet Technology, Oxford, England, (1967).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Send blank tape to above address; specify version desired - VAX or CRAY.

Also available through ARPANET, DECNET or BITNET. Telephone us for instructions.

Source language: FORTRAN 77

Computers it runs on: VAX, CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 Track 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hksc@lanl.arpa

Date of Latest Version: Oct. 86

Program Name: POISSON-BNL

Person to Contact: R. C. Gupta
Address: Brookhaven National Laboratory
Building 902-B
Upton, NY 11973
U.S.A.

Telephone Number: (516)282-4805, FTS 666-4805

Classification of Computer Code:

Component Design:

[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

POISSON BNL is the modified version of the 1981 Los Alamos National Lab. version of the Poisson Group codes created by Holsinger and Halbach. Major modifications have been made in the AUTOMESH and LATTICE programs. The user now has more control over the type of mesh to be generated and one can use different mesh size at any number of places, anywhere in a model. These improvements allow one to describe the finer details of a complicated geometry with a reasonable number of mesh points. In POISSON one now has access to the intermediate results while the original run is progressing, for a better control of convergence. Also there is a lesser chance that a solution will diverge.

Publications describing the code:

R. C. Gupta,"Modifications in the AUTOMESH and other POISSON Group Codes," Workshop on Electromagnetic Field Computation, Oct. 20 21, 1986. (To be published) (To be used in addition to the manual available from the Los Alamos Accelerator Code Group for the standard Poisson Group Codes.)

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact R. C. Gupta

Source language: FORTRAN 77

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [x] Networks

Tape format:

Diskette size & format:

Available through: [x] DECNET, [ ] ARPANET, [x] BITNET

[ ]

Network Address: BITNET gupta@bnlbag, DECNET(PHYSNET) BNL::AGS::GUPTA

Date of Latest Version: July 1986 Program Name: POISSON-LBL

Person to Contact: S. Caspi
Address: MS 46-161
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720
USA
Telephone Number: (415) 486 7244, FTS 451 7244

Classification of Computer Code:

Component Design:

[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This is a generalization of the standard POISSON code which replaces simple constant Neumann/Dirichlet boundary conditions by more general conditions expressible in the form of a series of harmonic functions giving the physically correct behavior of the potential at large distances. The code can handle the superposition of an externally applied field as well.

Although the original version was written for the HP1000, there exists a version which runs on the MFE CRAY. Documentation exists for the original POISSON codes; changes are described in the publications below.

Publications describing the code:

S. Caspi, M. Helm, and L. J. Laslett, "Incorporation of a Circular Boundary Condition into the Program POISSON," Lawrence Berkeley Internal Report LBL-17064 SSC-MAG-5 (Feb.1984).

S. Caspi, M. Helm, and L. J. Laslett, "The Generalization of a Circular Boundary Condition in the Program POISSON to Include No Symmetry and Axis-symmetry of Revolution," Lawrence Berkeley Internal Report LBL 18063 SSC MAG 12(Jul.1984)

S. Caspi, M. Helm, and L. J. Laslett, "Incorporation of an Elliptical Boundary Condition into the Program POISSON," Lawrence Berkeley Internal Report LBL-18798 SSC-MAG-28(Dec 1984).

S. Caspi, M. Helm, and L. J. Laslett, "Incorporation of Superposition into the Program POISSON," Lawrence Berkeley Internal Report LBL 19050 SSC MAG 31(Jan.1985)

S. Caspi, M. Helm, and L. J. Laslett, "The Application of Program POISSON to Axially Symmetric Problems — Magnetostatic and Electrostatic — with Use of Prolate Spheroidal Boundary," Lawrence Berkeley Internal Report LBL 20893 SSC MAG 68(Jan 1986).

S. Caspi, M. Helm, and L. J. Laslett, "Numerical Solution of Boundary Condition to Poisson's Equation and Its Incorporation into the Program POISSON," IEEE Trans. NS 32 (1985) 3722.

S. Caspi, M. Helm, and L. J. Laslett, "Incorporation of Toroidal Boundary Condition in the Program POISSON," Lawrence Berkeley Internal Report (in progress)(Dec 1986)

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Call Shlomo Caspi.

Source language: FORTRAN 77

Computers it runs on: HP1000, CRAY.

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Apr. 1986 Program Name: POISSON-TAC

Person to Contact: W. Schmidt or S. Pissanetzky
Address: Texas Accelerator Center
2319 Timberloch Place
The Woodlands, TX 77380
U.S.A.

Telephone Number: (713)363-0121

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This is a modification of the original POISSON code developed by Holsinger and Halbach, where the magnetization table is accurately interpolated, table truncation errors are avoided, and data input is simpler. Imagine the field at a point in a magnet as given by the sum of contributions from each little element of magnetized iron, plus a contribution from the currents. The field can be accurately calculated only if the magnetization is accurately known at each point. In POISSON, the magnetization is calculated by interpolating a table with the assumption that $1/\mu$ is a linear function of H^2 in each interval. It is now known that such an assumption produces errors as large as 5% in some intervals of the POISSON internal table (1010 steel), which are larger than the experimental errors in the measurement of μ.[1] To solve this difficulty, a table with 195 points has been generated for 1008 steel using accurate interpolation techniques.[2] This table has been implemented as the internal table of POISSON-TAC. The points are so close that POISSON's assumption of $1/\mu$ vs H^2 does not introduce any appreciable errors, and good field accuracy can be obtained. POISSON-TAC will issue a warning when truncation of the magnetization table occurs as a consequence of high fields during iteration. It has been shown that convergence to an incorrect solution takes place when truncation errors are present.[2] However, if truncation appears only during the initial iterations and then stops, convergence is to the correct solution.

POISSON-TAC also has an improved data input scheme. POISSON-TAC is available for VAX or FPS, and documentation exists for the original POISSON code.

Publications describing the code:

1. S. Pissanetzky, "The Interpolation of Magnetization Tables," COMPEL 5(1986)11-56.

2. R. Caciagno and S. Pissanetzky, "A Smooth Magnetization Table for 1008 Steel at 12K," Texas Accelerator Center Report TAC 257-85.

Is code documentation available? [x] Yes No

How may the code be obtained?

Contact W. Schmidt or S. Pissanetzky

Source language: FORTRAN 77

Computers it runs on: VAX and FPS

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Apr. 1986

Program Name: PROFI

Person to Contact: PROFI Engineering
Address: Wilhelminen Straße
D-6100
Darmstadt
Fed. Rep. Germany

Telephone Number: (06151) 26418

Classification of Computer Code:

Component Design:

[ ] Ion Source, [x] Magnet, [ ] RF cavity, [x] Electric machines

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The computer program PROFI (program for calculation of fields) which calculates 2- or 3-dimensional nonlinear magnetostatics fields, linear electrostatic or stationary electric fields, stationary non-linear 2-dimensional eddy-current fields and stationary temperature distributions. The program uses the finite difference method. The calculations may be carried out in one of five different coordinate systems, two of them being 3-dimensional. A set of service programs for preparing the input data, analysing the results, data handling etc. simplifies the use of the program.

Publications describing the code:

W. Müller et al., "Numerical Solution of 2- or 3D Nonlinear Field problems by means of the Computer Program PROFI," Archiv für Elektrotechnik 65 (1982) 299.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

This code can be bought from PROFI Engineering. Purchase also includes updates and some assistance in learning the code.

Source language: FORTRAN 77

Computers it runs on: IBM, VAX, CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: IBM/VAX standard
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: PRUD-M

Person to Contact: A. G. Dnikovsky
Address: Insitute for High Energy Physics
Serpukhov
USSR

Telephone Number:

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF Cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A program package for calculating eigenfrequencies and electromagnetic fields with azimuthal variations in axial-symmetric cavities of an arbitrary shape. The method is based on the representation of the equations of electrodynamics in variables ρh_φ, ρe_φ. Apart from frequencies and fields, the accumulated energy, distribution of losses in the metal, and other characteristics important for application are also computed. The package offers wide possibilities for graphic representation of the field topology, facilitating the analysis, and optimization of complicated accelerating structures. The program works in two modes: a mode of estimating the frequency spectrum in the specified interval and a mode of accurate computation of a specific frequency, related fields and derived quantities.

Publications describing the code:

A. G. Dnikovsky, Y. I. Portugalov and A. D. Ryabov, "PRUD-code for Calculation of the Nonsymmetric Modes in Axial Symmetric Cavities," Part. Accel. 12 (1982) 59.

Abramov, A. G.; Dnjkovskij, A. G.; Ershov, S. Yu.; Portugalov, Yu. I.; Portugalova, L. D., "Method to Find Eigen Electromagnetic Fields in Cavities of Arbitrary Shape. PRUD-M Program Package to Find Azimuthal Nonuniform modes in Axial-Symmetric Cavities. Part 2," Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov, Inst. Fiziki Vysokikh Energii, Report No. IFVE-OMVT-83-179 (1983), in Russian.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: PRUD-O

Person to Contact: A. G. Abramov
Address: Institute for High Energy Physics
Serpukhov
USSR

Telephone Number:

Classification of Computer Code
Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A program package intended for calculating azimuthal-symmetric modes in axisymmetric cavities as well as critical modes in longitudinally uniform waveguides. The discretization of electrodynamics equations uses eight-node quadrilateral isoparametric elements. The block power method for solving algebraic eigenvalue problems including estimations of convergence rate is used. To illustrate performance of the program and its separate units and estimate the accuracy, counting time, possibility of calculation oscillations with multiple eigenvalues, the program has been checked on problems having analytical solutions: oscillations in spherical and cylindrical resonators, waves in a rectangular waveguide. It is concluded that frequency by the PRUD-O program is more accurate than by the SUPERFISH program by approximately two orders .

Publications describing the code:

Abramov, A. G.; Dajkovskij, A. G.; Ershov, S. Yu.; Portugalov, Yu. I.; Ryabov, A. D., "PRUD-O Program Package for Accelerating Structure Calculation," Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii, Report No. IFVE-OMVT 83-3 (1983), in Russian.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: PRUD-OB

Person to Contact: A. G. Abramov
Address: Institute for High Energy Physics
Serpukhov
USSR

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The PRUD-OB program package is intended for calculating the azimuthally homogeneous modes in accelerator periodic axially-symmetrical systems. The problem is reduced to determination of two real functions for the structure half-period. The package is oriented for the problems of determining the periodic structure dispersion characteristics.

Publications describing the code:

Abramov, A. G.; Dajkovskij, A. G.; Portugalov, Yu. L.; Ryabov, A. D., "Modification of the PRUD-O Program Package for Calculating the Periodic Structures," Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov, Inst. Fiziki Vysokikh Energii, Report No. IFVE-OMVT-83-178 (1983), in Russian.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: RACETRACK

Person to Contact: A. Wrulich
Address: DESY
Notkestrasse 85
2000 Hamburg 52
Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [X] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [X] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

RACETRACK is a computer code to simulate transverse nonlinear particle motion in accelerators. Transverse magnetic fields of higher order are treated in thin magnet approximation. Multipoles up to 20 poles are included. Energy oscillations due to the nonlinear synchrotron motion are taken into account. Several additional features, as linear optics calculations, chromaticity adjustment, tune variation, orbit adjustment and others are available to guarantee a fast treatment of nonlinear dynamical problems.

Publications describing the code:

A. Wrulich, "RACETRACK — A Computer Code for the Simulation of Nonlinear Particle Motion in Accelerators," DESY Internal Reports 84/07 and 84/026 (1984).

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language: unknown

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1986 Program Name: RAY

Person to Contact: P. Spädtke
Address: GSI
Postfach 11 05 41
6100-Darmstadt
Fed. Rep. Germany

Telephone Number: 06151/359-323

Classification of Computer Code:
Component Design:
[x] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Electron gun

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam transport lines

Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Simulation of ions/electrons within electrostatic/magnetostatic fields. Electrostatic potentials are calculated exactly, interactively. Menu-driven program. Including high resolution colored graphics. 2D-code. Cylindrically symmetric.

Publications describing the code:

Presentation on low energy ion beams. Conference in GB, 1986.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

On request.

Source language: Machine Language

Computers it runs on: Commodore C64, C128

It is available as: [ ] Source code, [x] Executable only

Source Media: [ ] Listing, [ ] Tape, [x] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format: 5 1/4" IBM DOS

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1986

Program Name: RAYTRACE

Person to Contact: Stanley Kowalski
Address: Laboratory of Nuclear Science
Bldg. 26-505
MIT
Cambridge, MA 02139
USA
Telephone Number: (617)253-4288

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

RAYTACE is an ion-optical computer code, which numerically integrates the particle differental equations of motion through real fields and can be used to trace rays one-by-one through a sequence of electromagnetic devices. The main types of elements that are presently supported include dipoles (6 versions), multipoles (4 through 12 poles), electrostatic deflector, velocity filter, lens, and solenoid. For an ion-optical system with a symmetry plane, the accuracy of the trajectory calculations in this plane is comparable to the accuracy of the description of the electric and magnetic fields, i.e., RAYTRACE computes to essentially infinite order. The field components for trajectories off this median plane for dipoles are described by a fourth-order Taylor series; off-axis in multipoles the field is described by a Taylor series carried to at least fifth-order.

Users of RAYTRACE practically always start with TRANSPORT to determine first and second order parameters — in other words the basic layout of the system. RAYTRACE is then used to fine tune the system. First and second order parameters generally have to be readjusted slightly, and when dipoles are involved there are also zeroth order adjustments, i.e., centerline offsets. The major function of RAYTRACE, however, is to calculate higher-order aberrations in the optics, and to aid in correcting these aberrations, whenever possible. The program does not have a built-in automatic fitting routine for minimizing image aberrations, etc., but it has been used as a subroutine for such programs.

Since the program traces one ray at a time, it is not readily adaptable to handle space charge forces as they occur in systems with intense beams.

Publications describing the code:

S. Kowalski and H. A. Enge, "RAYTRACE," Proc. of Second Int. Conf. on Charged Particle Optics, Albuquerque (1986) to be published. Also there is a MIT internal report.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Call Los Alamos Accelerator Code Group, AT-6, Los Alamos National Laboratory (505) 667-6677 (or 667-2839). You can also contact Stan Kowalski directly.

Source language: FORTRAN

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 track, 1600bpi
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hks@lanl.arpa or sk@mitlns

Date of Latest Version: Oct. 1985

Program Name: RELAX3D

Person to Contact: Corrie Kost
Address: Triumf
4004 Wesbrook Mall
Vancouver, B.C.
Canada V6T-2A3

Telephone Number: 604-2221047 ext. 310

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Electrostatic devices

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

User friendly interactive program which solves the Laplace/Poisson equation in 3D Cartesian or 2D cylindrical coordinate system with dielectrics (2D only) by the method of successive over-relaxation (finite difference). Problem cases are dynamically loaded from a user-written subroutine describing the geometry. Contour plots of the potential distribution along any slice can be produced.

Publications describing the code:

H. Houtman, C. J. Kost, "A FORTRAN Program (RELAX3D) to Solve the 3 Dimensional Poisson (Laplace) Equation", Proc. EPS Conf. on Computing in Accelerator Design and Operation, Berlin 1983, Springer Verlag (1984).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Corrie Kost.

Source language: FORTRAN

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: BACKUP
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: Nov. 1985

Program Name: REVMOC

Person to Contact: Corrie Kost
Address: Triumf
4004 Wesbrook Mall
Vancouver, B.C.
Canada V6T-2A3

Telephone Number: 604-2221047 ext. 310

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] beam line transport

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Second-order Monte Carlo beam transport program which includes the effects of multiple scattering, decay, nuclear scattering, and energy loss. The program cannot optimize beam line elements and is thus primarily used to do detailed checks on a TRANSPORT-designed beam line. Aberration coefficients (transfer matrices) can be calculated for the full beam line.

Publications describing the code:

C. J. Kost, P. A. Reeve, "A Monte Carlo Beam Transport Program, REVMOC," Proc. EPS Conference on Computing in Accelerator Design and Operation, Berlin, 1983, Springer-Verlag (1984).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Corrie Kost.

Source language: FORTRAN

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: BACKUP
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1986 Program Name: RFQLIB

Person to Contact: Walter P. Lysenko
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-7431

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The RFQLIB system does particle tracing simulations for RFQ linear accelerators. The particle equations of motion are numerically integrated using time as the independent variable. The forces on the particles are computed in two subroutines. Subroutine FOR computes the external electric forces of the rf field in the RFQ. The RFQ parameters are stored in a table as a function of the longitudinal coordinate. Interpolation is used to get the parameters at given values of the synchronous particle position. Subroutine SCFOR computes the space charge forces by a particle-in-cell method using the electrostatic approximation. An r-z Poisson solver is used with a conducting boundary at r = const and with periodic boundary conditions in the z-direction.

Publications describing the code:

W. P. Lysenko, "An RFQ Simulation Code" in Proc. of 1984 Linear Accel. Conf., ed. by N. Angert, GSI 84-11 (1984) 327.

See also LANL Informal Report AT6: ATN-84-1.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Call Walter Lysenko.

Source language: FORTRAN

Computers it runs on: CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: whatever
Diskette size & format:

Available through: [x] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: WPL or LANL on ARPANET

Date of Latest Version: Jan. 1985 Program Name: RING

Person to Contact: Eva S. Bozoki
Address: NSLS Dept.
Brookhaven National Laboratory,
Upton, NY 11973
USA

Telephone Number: (516) 282 3701, FTS 666 3701

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

It is a modeling program, which can be used

1) off line as a design program (like e.g. SYNCH, MAD, etc.) or

2) on-line as a control program. (When used as a control program, the program-microprocessor interface is specific to the installation.)

It has two major modules, one for:

1) tune and chromaticity optimization/control, and one for

2) orbit calculation/correction/control (It uses the MICADO algorithm for minimizing the orbit displacements around the ring).

In addition to the standard lattice elements (drift, bend, quad, sext.) undulators can also be included. Edge focusing is calculated as in TRANSPORT. Chromaticity due to dipoles is calculated as in SYNCH.

Machine and beam p... ...ters, synchrotron integrals, damping partitions, rate of change of dumping partitions, energy spread, spatial beam size with and without coupling, bunch length, quantum and Touschek lifetime, etc. are calculated on demand.

Publications describing the code:

Eva S. Bozoki, "High Level Control Programs at NSLS," Conf. on Computing in Accelerator Design and Operation, 1983, Springer Verlag (1984) 420

Brookhaven National Laboratory internal report no. BNL 31361 (1982).

Brookhaven National Laboratory internal report no. BNL 35507 (1984).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Eva Bozoki.

Source language: FORTRAN

Computers it runs on: DG

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address:

Date of Latest Version: May 1985 Program Name: RMKT

Person to Contact: Bruce Carlsten
Address: MS H825, Group AT-7
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 5657, FTS 843-5657

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Klystron simulations.

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Ring model, time as the independent parameter, 2 1/2 D, large signal beam-rf cavity interaction simulations, use of so-called "dynamic wavelength" to ensure self-consistent particle motion, iterations to ensure self-consistent cavity gap voltages and space charge.

Publications describing the code:

P. Tallerico and B. Carlsten, "Computer Modeling the Klystron," IEEE Trans. on Nucl. Sci., NS-30 (1983) 2170.

P. Tallerico and B. Carlsten, "Self-Consistent Klystron Simulations," IEEE Trans. on Nucl. Sci., NS-32 (1985) 2837.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Bruce Carlsten.

Source language: FORTRAN

Computers it runs on: CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: As desired
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address:

Date of Latest Version: 1981 Program Name: SATDSK

Person to Contact: G. S. McNeilly
Address: Oak Ridge National Laboratory
Building 4500N
Oak Ridge, TN 37831-6238
U.S.A.

Telephone Number:

Classification of Computer Code:
Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF cavity, [ ]
Accelerator Optimization:
[ ] Linac, [x] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

SATDSK calculates the median plane magnetic field due to fully saturated iron poletips. Optionally, SATDSK calculates the magnetic field due to disks of magnetic charge, which can simulate the effect of holes in the iron poletip, or circular trim rods embedded in the poletip. SATDSK is intended for poletip geometries that are both symmetric about the median plane, and have azimuthal sector symmetry. Thus the program is primarily designed to simulate the magnetic field due to iron poletips in superconducting cyclotrons.

Publications describing the code:

Gregory S. McNeilly, "SATDSK: A Numerical Simulation of the Magnetic Field Due to Saturated Iron in Cyclotron Poletips," Computer Phys. Comm. 23(1981)199.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

CPC Program Library, Queen's University of Belfast, N. Ireland; Catalogue number: ABKI

Source language: FORTRAN

Computers it runs on: IBM 360/91

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: Feb. 1986

Program Name: SCHAR

Person to Contact: Prof. R. J. Hayden
Address: University of Montana
Physics Department
Missoula, MT 59812
U.S.A.

Telephone Number: (406)243-2073

Classification of Computer Code:

Component Design:

[x] Ion Source, [ ] Magnet, [ ] RF cavity, [x] Charge Exchange Solenoids

Accelerator Optimization:

[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[x] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The code traces macrofilaments or macroparticles through electromagnetic fields with or without space charge. Fields may be analytical or tabulated grid values. Input options for the particle distribution include: measured, KV, 4 Vol or 6 Vol. in phase space.

Publications describing the code:

R. J. Hayden and M. J. Jakobson,"The Space Charge Computer Program SHAR," IEEE Trans. NS-30(1983)2540.

R. J. Hayden and M. J. Jakobson,"Macrofilament Simulation of High Current Beam Transport," IEEE Trans. NS 32(1985)2549.

M. J. Jakobson and R. J. Hayden, Proc. of Ion Optics Conf. (May 1986) To be published in Nuc. Instru. & Meth.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

Contact Prof. Hayden or Prof. Jakobson at above address

Source language: FORTRAN

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format: 1600BPI UNIX

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

(Documentation is in the form of comment lines in the program.)
Date of Latest Version: Apr. 1986

Program Name: SCOP-2

Person to Contact: Ingo Hofmann
Address: GSI
Postfach 110541
D-6100 Darmstadt-11
Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [x] Synchrotron, [x] Storage Rings

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A 2D (x-y Cartesian) PIC code used for space-charge dominated beam transport studies. Recently used for studies of resonance crossing in storage rings under space-charge-dominated conditions. 2D trajectories, tracking.

Publications describing the code:

I. Bozsik and Ingo Hofmann, "Space Charge Effects in the Focusing of Intense Ion Beams," Nucl. Inst. Mtds. 187 (1981) 305–311.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Source language: FORTRAN

Computers it runs on: IBM 3090

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: (not given)

Date of Latest Version: Apr. 1986

Program Name: SCOP-RZ

Person to Contact: Ingo Hofmann
Address: GSI
Postfach 110541
D-6100 Darmstadt-11
Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[x] Linac, [ ] Cyclotron, [x] Synchrotron, [x] Storage Rings

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A particle-in-cell simulation code with 3D trajectories and a 2D Poisson solver (r-z). Conducting cylindrical pipe as boundary condition. A user-defined impedance can be included. Code has been used to study rf bunching and the longitudinal microwave instability.

Publications describing the code:

I. Hofmann and I. Boszik, Proc. of the Symposium on Accelerator Aspects of Heavy Ion Fusion, GSI Darmstadt (1982) 181.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Write to Ingo Hofmann.

Source language: FORTRAN 77

Computers it runs on: IBM 3090 and CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address:

Date of Latest Version: Aug. 1985

Program Name: SIIRIMP

Person to Contact: Robert Ryne / Robert Gluckstern
Address: Dept. of Physics and Astronomy
University of Maryland
College Park, MD 20742
USA

Telephone Number: (301) 454 7476

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

SIIRIMP is a post-processor to the program SUPERFISH. SIIRIMP computes the cavity frequency by a variational technique, using the fields calculated by SUPERFISH. The frequency computed by SIIRIMP has an error $\delta f/f \propto 1/N^2$ (for an N x N mesh). Thus, by using SIIRIMP as a post processor, one can make the SUPERFISH mesh coarser, and still obtain comparable accuracy in f.

Publications describing the code:

R. L. Gluckstern, R. D. Ryne, R. F. Holsinger, "Numerical Programs for Obtaining Accurate Resonant Frequencies of Modes in Azimuthally Symmetric Electromagnetic Cavities," Proceedings of the COMPUMAG Conference, Genoa, Italy, IEEE Trans. MAG-19 (1983) 141.

Is code documentation available? [ ] Yes [x] No

How may the code be obtained?

It is located in MASS under /095680/585/SIIRIMP (at Los Alamos National Laboratory). Contact the Los Alamos Accelerator Code Center (505) 667 6677 (or 667 2839), FTS 843 6677.

Source language: FORTRAN

Computers it runs on: CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: 9trk, 1600 bpi
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: lbl-csl@lbl-arpa

Date of Latest Version: Apr. 1982 Program Name: SIMTRAC

Person to Contact: Daniel Brandt
Address: LEP Div.
CERN
1211 Geneva 23
Switzerland

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [x] Wakefield Effects

Other:

Short Description: (Purpose, capabilities algorithms, special features, etc.)

SIMTRAC is a simulation program for tracking longitudinal and transverse single-bunch effects in a circular electron machine for a number N of superparticles. The program includes damping, collective effects such as transition, beam-loading of rf cavities and wakefields. For a typical run 1000 superparticles can be followed for around 5000 turns. Output includes beam dimensions every NREPR turns, phase space plots, bucket contours, and averages over a given number of turns.

Publications describing the code:

D. Brandt, "SIMTRAC — A Simulation program for Tracking Longitudinal and Transverse Single Bunch Effects," CERN internal report LEP Note 512, 15 (1984).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Daniel Brandt.

Source language: FORTRAN

Computers it runs on: IBM

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address:

Date of Latest Version: Apr. 1986

Program Name: SINAC

Person to Contact: Gerhard Rudolf
Address: SIN
CH 5234 Villigen,
Switzerland

Telephone Number: (059) 99-3394

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [x] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [x] Cyclotron, [ ] Synchrotron, [x] Magnets

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Orbit calculations from magnetic field measurements; processing of magnetic field measurements in cylindrical coordinates.

Publications describing the code:

IV Int. Conf. on Isochronous Cyclotrons, Gatlinburg, TN, IEEE/NS-13, (1966) 194-214.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Write to Gerhard Rudolf, SIN.

Source language: FORTRAN 77

Computers it runs on: VAX, CDC/NOSVE

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: 80 char/line, 10 lines/block
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: 1985 Program Name: SLIM

Person to Contact: Louis Hand
Address: Newman Laboratory of Nuclear Science
Cornell University
Ithaca, NY 14853
USA

Telephone Number: (607) 255 6023 (or 1000)

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[x] Stability, [ ] Impedances, [x] depolarization

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

SLIM is a tracking code which includes spin orbit interaction to calculate the depolarization of polarized beams due to closed orbit distortions caused by misalignments. It uses an 8x8 matrix formalism, and includes effects of radiation damping. Stability is determined by looking at the eigenvalues of the total transport system.

There exists documentation for the 1984 version of the code as written by Alex Chao, but it is unknown whether D. Barber or L. Hand have updated the documentation.

Publications describing the code:

A. W. Chao, "Evaluation of Beam Distribution Parameters in an Electron Storage Ring," J. Appl. Phys. 50 (1979) 595.

A. W. Chao, "Evaluation of Radiative Spin Polarization in a Electron Storage Ring," Nucl. Inst. Mtds. 180 (1981) 29.

A. W. Chao, "Calculation of Polarization Effects," Computing in Accelerator Design and Operation, Proc. of 1983 Berlin Conf. Springer-Verlag, Berlin, (1984) 59.

H. Mais and G. Ripken, DESY report 83 062 (1983).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Desmond P. Barber, DESY, Notkestrasse 85, D 2000 , Hamburg 52, Fed. Rep. Germany.

Louis Hand, Cornell Univ. Ithaca, NY 14853, (607) 255 6023 (or 1000).

Source language: FORTRAN

Computers it runs on: CDC, IBM

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Mar. 1982

Program Name: SNOW

Person to Contact: James P. Brainard
Address: Org. 2564, Building 891
Sandia National Laboratory
Albuquerque, NM 87185
USA

Telephone Number: (505) 844-6462, FTS 532-6462

Classification of Computer Code:

Component Design:

[x] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A digital computer program, SNOW, has been developed for the simulation of dense ion beams. The program simulates the plasma expansion cup (but not the plasma source itself), the acceleration region, and a drift space with neutralization if desired. The ion beam is simulated by computing representative trajectories through the device. The potentials are simulated on a large rectangular matrix array which is solved by iterative techniques. Poisson's equation is solved at each point within the configuration using space-charge densities computed from the ion trajectories combined with background electron and/or ion distributions. (Note that some changes have been made in the code recently that have not been documented. It may be difficult to run the code without personal help from Brainard. Jack Boers is presently writing a new version of the code.)

Publications describing the code:

Jack E. Boers, "SNOW — A Digital Computer Program for the Simulation of Ion Beam Devices," Sandia Laboratory Internal Report no. SAND70-1027 (1980).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact John Brainard at the above address or Jack Boers, Varian Corp., Gloucester, MA 01930, Phone (617) 281-2000, ext. 4344.

Source language: FORTRAN77

Computers it runs on: CRAY, VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: SOTRM

Person to Contact: E. R. Close
Address: 1 Cyclotron Road
Lawrence Berkeley Laboratory
Berkeley, CA 94720
USE

Telephone Number: (415) 486 6166, FTS 451 6166

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam Transport

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other: Generate transport matrices from fields

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

In the design of beam transport systems, it is often desirable to generate transformation elements from a magnetic field by numerically integrating the orbits through the field. Such a transformation matrix is needed when only a measured field is available or when the effect of various trial magnetic fields is being investigated. Essentially, program SOTRM produces first- and second-order elements when an arbitrary magnetic field is given. The resulting transformation matrix is readily applicable to beam transport programs such as TRANSPORT.

SOTRM formulates a system of equations which, when integrated, produces the coordinates of the reference particle and of any nearby particle(s) specified. Once this is completed, the program calculates (if requested) the first- and second order transformation matrix elements using the reference orbit as the origin in a suitably chosen coordinate system.

Publications describing the code:

E. R. Close, "SOTRM — A Program to Generate First and Second Order Matrix Elements by Tracking Charged Particles in a Specified Magnetic Field," Lawrence Berkeley Laboratory Report UCRL-19823 (1970).

E. R. Close, "Generation of First and Second Order Transformation Elements from a Given Magnetic Field," Nucl. Inst. Methods 89 (1970) 205

John S. Colonias, "Particle Accelerator Design — Computer Programs," Academic Press, New York (1974) 194

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language: FORTRAN

Computers it runs on: CDC 6600, 17600

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Jan. 1986

Program Name: SPEAM VI

Person to Contact: Corrie Kost
Address: TRIUMF
4004 Wesbrook Mall
Vancouver, B.C.
Canada V6T-2A3

Telephone Number: (604) 222-1047 ext. 310

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Maguet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam Line

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Calculates and plots the rms beam envelopes of a continuous non-relativistic proton beam through various elements (magnetic and electrostatic). Space charge forces are included. Either the generalized Kapchinsky-Vladimirsky (KV) equations or those of Enigh may be used.

Publications describing the code:

TRIUMF design notes TRI-DN-73-11, TRI DN-71-31, TRI-DN-74-32.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Corrie Kost.

Source language: FORTRAN

Computers it runs on: VAX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: BACKUP
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1985 Program Name: SUPERFISH Group Codes

Person to Contact: Los Alamos Accelerator Code Group
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-6677, FTS 843-6677

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The SUPERFISH package evaluates the eigenfrequencies and fields for arbitrary-shaped 2-D waveguides in cartesian coordinates and 3-D axially symmetric rf cavities in cylindrical coordinates. The package contains codes to generate the mesh, plot fields and evaluate auxiliary quantities of interest to drift tube linac design, e.g., transit time factors, power losses, effect of perturbations.

Publications describing the code:

K. Halbach and R. F. Holsinger, "SUPERFISH — A Computer Program for Evaluation of RF Cavities with Cylindrical Symmetry," Part. Accel. 7 (1976) 213.

K. Halbach et. al., "Properties of the Cylindrical RF Evaluation Code SUPERFISH," Proc. 1976 Linear Accel. Conf., Chalk River Nuclear Lab Report AECL-5677, 122.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Send blank tape to above address; specify version desired — VAX or CRAY. Also available through ARPANET, DECNET, OR BITNET. Telephone us for instructions.

Source language: FORTRAN 77

Computers it runs on: VAX, CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: 9 track, 1600 bpi
Diskette size & format:

Available through: [x] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: hks@lanl.arpa

Date of Latest Version: Apr. 1986

Program Name: SYMP3

Person to Contact: Gerry P. Jackson
Address: Fermilab
P.O. Box 500
Batavia, Il 60510
USA

Telephone Number: (312) 840 2317 or (3000)

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF Cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Colliding Beam

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A computer program to simulate colliding beam dynamics in e^+ e^- storage rings has been written. The first version of the program did not incorporate sextupoles but showed some of the characteristics measured in various machines in the past. The focus of the present work is the understanding of the effects of sextupoles on these results. To do this thin sextupoles are added in two ways. The first employs a linear-transfer/nonlinear-kick algorithm for each lattice cell. The second method is to create a symplectic second-order transfer map for the entire machine. While the first method is exact, it is slow for machine lattices with many sextupoles. The luminosities, beam sizes, and tune shifts from these programs are calculated. In addition, the shapes of the time-averaged transverse distributions are obtained. The beam-beam interaction is accomplished each turn by first calculating the beam centroids and rms sizes, and then using this information to determine the transverse kicks received by each test particle. The bunch positions and sizes are output each turn. In addition, the test particle positions are binned and accumulated in 1000 turn intervals.

Radiation excitation and damping are added to each test particle each turn in order to maintain the initial (noncolliding) horizontal and vertical emittances. Since there are no energy oscillations the contribution to the horizontal beam size from the horizontal off-energy function at the interaction region is replaced by additional betatron emittance.

Early versions of the program were in FORTRAN but the latest version has been optimized for the IBM supercomputer at Cornell. It contains FPS assembly language programming which would not be portable to other machines.

Publications describing the code:

G. Jackson and R. H. Siemann, "A Computer Simulation Study of e^+e^- Storage Ring Performance as a Function of Sextupole Distribution," IEEE Trans NS 32 (1985) 2541

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

Call Gerry Jackson.

Source language: FORTRAN + FPS

Computers it runs on: IBM FPS-264

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1986 Program Name: SYNCH

Person to Contact: Ardith S. Kenney
Address: Lawrence Berkeley Laboratory
1 Cyclotron Road
Building 46/161
Berkeley, CA 94720
USA
Telephone Number: (415) 486 6631, FTS 451 6631

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [x] Transport lines

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[x] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

SYNCH is a computer program for use in the design and analysis of synchrotrons, storage rings and transport lines. Lattices are defined by statements describing beamlines and their components: drifts, dipoles, quadrupoles, sextupoles, other beamlines, etc. Betatron functions and closed orbit distortions due to momentum deviation or misalignments can be obtained. Orbits and beam ellipses can be tracked, and emittances, damping time, etc., calculated. Design of machines is done by versatile fitting algorithms.

Publications describing the code:

A. A. Garren and A. S. Kenney, LBL; E. D. Courant, BNL; M. J. Syphers, FNAL, "A User's Guide to SYNCH," (1985)

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

A. S. Kenney

Source language: FORTRAN

Computers it runs on: VAX, CDC

It is available as: [x] Source code, [x] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [x] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: BITNET DECNET SA2::ARDITH BITNET ardith@lbl MILNET ARPANET ardith@esa2.arpa

Date of Latest Version: Jan. 1986

Program Name: TBCI

Person to Contact: Thomas Weiland
Address: Deutsches Elektronen Synchrotron/DESY
Notkestrasse 85 d2000
Hamburg 52
Federal Republic of Germany

Telephone Number: 49-40-8998-3196

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [x] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[x] Stability, [x] Impedances, [x] Wakefield Effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TBCI analyses the electromagnetic interaction between bunched beams of charged particles moving through cylindrically symmetric cavities by calculating wake fields. The default Gaussian shape function for the bunch may be replaced by a shape of the user's choice.

There are several post processors for TBCI. WAKCOR subtracts a tube wake field from the total wake. WAKFLS reads fields and wakes as saved at every time step and does a fourier transformation. WAKOUT reads the wake field and prints it. It can also calculate the gradient impedance, plot the bunch density and normalize wakes to 1 C.

In addition there are two variations of TBCI. TBCI00 follows the progress of TEM waves launched into a structure, e.g., a series of rf cavities connected by a vacuum pipe, from the left open boundary.

TBCI01 is the same as TBCI00 except that TM01 waves are launched into the structure.

Publications describing the code:

T. Weiland, Proceedings of the XIth International Conference of High Energy Accelerators, Geneva (1980) 570 5.

T. Weiland, Nucl. Instr. & Meth. 212(1983)13 31

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

One must get the source code directly from Thomas Weiland

Executable form of the code is installed at Los Alamos and Lawrence Livermore National Laboratories. (For more information on these contact Therese Butts (505) 667 9385, FTS 843 9385 at LANL.)

Source language: FORTRAN 77

Computers it runs on: CRAY, VAX/VMS, IBM 3081.

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☒ Networks
Tape format: EBCDIC
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☒ BITNET
☐

Network Address: mpywei%dlhidesy3.bitnet

Date of Latest Version: Oct. 1986 Program Name: TEAPOT

Person to Contact: Lindsay Schachinger
Address: SSC-CDG
c/o LBL, MS 90-4000
One Cyclotron Road
Berkeley, CA 94708
U.S.A.
Telephone Number: (415) 486-6590, FTS 451-6590

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TEAPOT (Thin Element Accelerator Program for Optics and Tracking), developed for design work on the Supercollider (SSC), is a tracking code which treats all elements (aside from drifts) as thin elements. TEAPOT reads a lattice in Standard (MAD) Input Format and converts all thick elements to thin ones. If a quadrupole is of "interaction region" type, it is split into four thin quadrupoles. TEAPOT neglects fringe fields. A Twiss analysis can be performed and the tunes can be adjusted using a thin lens matrix representation of the machine. Magnetic errors and misalignments can be added to elements, and the resulting lattice can be tracked exactly. A full Twiss analysis with errors is also available, which uses tracking to derive the transfer matrices for the machine. The machine can be decoupled using skew quadrupoles, the s can be readjusted, and the chromaticity can be fit in the presence of errors. The command form POT is a dialect of that used by MAD.

There exists a called MATPOT that produces a third order 4x4 matrix representation for the full ring of MATPOT can be put into MARYLIE for the calculation of auxiliary quantities such a y and nonlinear invariants. MATPOT was written by Etienne Forest.

Publications describing the code:

L. Schachinger and R. Talman, Part. Acc. (to be published)

L. Schachinger and R. Talman, "TEAPOT: A Thin Element Accelerator Program for Optics and Tracking," SSC Central Design Group internal report SSC-52 (1985).

Etienne Forest, "Lie Algebraic Maps and Invariants Produced by Tracking Codes," SSC-78 (1986).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Lindsay Schachinger

Source language: FORTRAN 77

Computers it runs on: VAX, CRAY, and SUN

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [x] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: CSA::LINDSAY (decnet); LINDSAY@LBL-CSA3 (arpa or milnet); LINDSAY@LB (bitnet).

Date of Latest Version: Dec. 1985

Program Name: TOSCA (Ver. 4.3)

Person to Contact: John S. Whitney
Address: Vector Fields, Ltd.
Osney Mead
Oxford OX2 OEE
England

Telephone Number: 0865 248236

Classification of Computer Code:

Component Design:
[x] Ion Source, [x] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TOSCA is a 3D code for magnetostatic and electrostatic fields. It is the most advanced program available for non-linear magnetostatic field computation. It can be used for a wide range of applications including fusion magnets, particle accelerators, electron lenses and deflection magnets, corrosion protection and non destructive testing. TOSCA uses a discrete finite element model in order to solve the partial differential equations governing the behavior of a system.

The finite element mesh is formed from hexahedra with 'ruled' faces which are automatically subdivided into elements. A 2D grid is created initially and this can then be swept through space thus creating 3D volumes. The sweep operations include translation, rotation and projection.

One of TOSCA's special features is that the finite element mesh does not have to model the conductors. These can slice through the mesh quite arbitrarily. The conductors are modeled using a set of primitive shapes that include arcs, bars, curved-sided hexahedra and more complex complete circuits.

The mesh primitive blocks are assigned material names and geometric properties, for example, orientation. Facilities are provided for input of nonlinear constitutive relationships and for display of the function values and derivatives.

TOSCA uses 8 and 20 node isoparametric 'brick' elements. These can be mixed together; the program will enforce inter-element continuity. The type of element created in each primitive may be selected by the user. This allows the higher order elements to be used where solution accuracy is important. Three result evaluation modes are provided to give a choice between speed and accuracy.

The suite of programs was designed to be used in a distributed computing environment. Data files created by SCARPIA for TOSCA can be easily transferred between computers and result files from TOSCA can be returned. TOSCA provides full check point, drop file and restart facilities so that the program maximizes the efficient use of computer resources. The PTOSCA program allows results to be displayed graphically and further calculations can be performed, e.g. particle trajectories.

Publications describing the code:

IEEE Proc. Vol. 127 Pt. B No. 6 (1980).

Vector Fields, Data Sheet Ref: 018611

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

By license agreement with Vector Fields, Ltd.

Source language: FORTRAN 77

Computers it runs on: PRIME, VAX, IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: As required
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[x] DOE Network

Network Address: Contact Robert J. Lari, Argonne Natl Lab, (312) 972 6632

Date of Latest Version: Apr. 1986 Program Name: TRACE

Person to Contact: The Los Alamos Accelerator Code Group
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505)667 6677 or 2839, FTS 843 6677

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]
Accelerator Optimization:
[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description. (Purpose, capabilities, algorithms, special features, etc.)

TRACE is an interactive, first-order envelope-tracing, beam-dynamics computer code with space charge. It includes some unique features as well as a number of elements not commonly found in other beam-transport programs such as the permanent-magnet quadrupole (PMQ), radio-frequency quadrupole (RFQ), RF gap, accelerator column, and accelerator tank. The code also has a number of fitting capabilites, allowing almost any element parameter in the beamline to be varied, including space charge. TRACE calculations provide immediate graphic display, including the beam envelope and the phase-space ellipses in the transverse dimensions. The program is easy to use and contains its own help package that lists all instructions necessary for input, calculations, and graphic output.

Publications describing the code:

K. R. Crandall; D. P. Rusthoi, "TRACE: An Interactive Beam-Transport Code," Proceedings of the 1984 Linear Accelerator Conference, Darmstadt-Seeheim, FRG (1984) 371-373.

K. R. Crandall, D. P. Rusthoi, "Documentation for TRACE: An Interactive Beam-Transport Code," Los Alamos National Laboratory Internal Report No. LA-10235-MS (1985) 66 pp.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact The Los Alamos Accelerator Code Group or D. Rusthoi(505) 667 2796, FTS 843 2796

Source language: FORTRAN

Computers it runs on: CDC 6600, 7600, VAX 11/750

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: VAX: 1600 bpi, ASCII
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1986

Program Name: TRACE3D

Person to Contact: The Los Alamos Accelerator Code Group
Address: MS H829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505)667 6677 or -2839, FTS 843-6677

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☒ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☒ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRACE 3-D is an interactive program that calculates the envelopes of a bunched beam (including linear space-charge forces) through a user-defined transport system. The transport system may consist of the the following elements: 1) drift, 2) thin lens, 3) quadrupole, 4) permanent-magnet quadrupole (PMQ), 5) solenoid, 6) doublet, 7) triplet, 8) bending magnet, 9) edge angle (for bend), 10) rf gap, 11)radio-frequency-quadrupole cell (RFQ), 12) rf cavity, 13) coupled-cavity tank, 14) a user-defined element, and 15) a coordinate rotation.

The beam is represented by a 6 x 6 σ-matrix (introduced by the TRANSPORT program) defining a hyperellipsoid in six-dimensional phase space. The projection of this hyperellipsoid on any two-dimensional plane is an ellipse that defines the boundary of the beam in that plane. Using a sequence of matrix transformations, the beam can be "followed" between any two elements. The user can change any parameter and observe the effect on the beam envelopes and on the output beam ellipses. Also, several matching options are available that determine values for the ellipse parameters or for specified transport-system parameters (such as quadrupole gradients) to meet specified objectives.

Publications describing the code:

K. R. Crandall and R. S. Mills, "TRACE 3-D Documentation," Los Alamos National Laboratory internal document (1985).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

From the Los Alamos Accelerator Code Group. Contact Helen Stokes, AT-6, LANL, (505) 667-9131 or (667-2839); FTS 843-9131

Source language: FORTRAN

Computers it runs on: CRAY

It is available as: [ ] Source code, [ ] Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☒ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☒ ARPANET, ☒ BITNET
☐

Network Address: hks@lanl.arpa

Date of Latest Version: 1981

Program Name: TRACK

Person to Contact: Robert J. Lari
Address: Argonne National Laboratory
Argonne, IL 60439
USA

Telephone Number:

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] spectrometers

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The TRACK/BEAM commands of GFUN-3D are useful for tracking a charged particle through a magnetic field and plotting the path. It was felt the subroutines associated with these two commands would form a useful stand-alone program where the user supplied the magnetic field instead of the GFUN 3-D calculated field. Hence, measured fields could also be used. The user-supplied fields are stored on disk as a field map or as the edge field of a uniform field magnet. The graphic subroutines are written for use on the Tektronix 4012.

Publications describing the code:

R. J. Lari, "TRACK — A Program to Track Charged Particles Through a Magnetic Field and Plot the Path," Proc. of a Workshop on High-resolution Large-acceptance Spectrometers, at Argonne National Laboratory (1981), Argonne National Laboratory report ANL/PHY-81-2 and CONF-8109123.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Robert J. Lari

Source language: FORTRAN

Computers it runs on: IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: LRECL 80, RECFM FB, BLKSIZE 800.
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address: None

Date of Latest Version: unknown

Program Name: TRAJECTORY

Person to Contact: A. C. Paul
Address: MS L626
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: (415) 423-3183, FTS 543-3183

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:

[ ] Linac, [x] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [x] Cyclotron, [ ] Synchrotron, [ ]

Anaiysis:

[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

An orbit and ion optic matrix-transport program originally used for the 184-inch LBL cyclotron.

Transport-matrix output can be used as input to TRANSPORT or OPTIC. ~ 50 K_8 memory, runs in ~ 1 min. on CDC 6600.

Will track protons and pions in the median plane of the cyclotron.

Publications describing the code:

A. C. Paul, "TRAJECTORY — An Orbit and Ion Optic Matrix Program for the 184-inch Cyclotron," Lawrence Berkeley Laboratory Report UCRL-19407 (1969).

John S. Colonias, "Particle Accelerator Design: Computer Programs," Academic Press, New York (1974) 203.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Unknown

Source language: FORTRAN

Computers it runs on: CDC 6600/7600, VAX 11/70's

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: TRAMP

Person to Contact: J. W. Gardner
Address: Rutherford-Appleton Laboratories
Chilton, Didcot
Oxon OX11 0QX
England

Telephone Number:

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Beam Transport

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Beam Transport

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program TRAMP was developed at Rutherford High Energy Laboratory by Gardner and Whiteside to provide solutions to problems encountered in beam transport design. It has been extensively modified by various exper. centers to fit the needs and the computer facilities of their respective laboratories.

The LBL version is capable of tracking and matching trajectories, beam profiles, or phase-space ellipses through a given beam transport system. Most beam elements are represented by 2x2 matrices for each plane, but the code handles sextupoles by integration of trajectories. Matching can be done on dispersion.

Publications describing the code:

J. W. Gardner and D. Whiteside, "TRAMP — Tracking and Matching Program," Rutherford Laboratory Report NIRL/M/21 (1961).

J. W. Gardner and D. Whiteside, "A FORTRAN version of TRAMP," Rutherford Laboratory Report NIRL/M/41 (1963).

John S. Colonias, "Particle Accelerator Design: Computer Programs," Academic Press, New York (1974) 176.

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

Unknown (May still be available from LBL).

Source language: FORTRAN

Computers it runs on: CDC 6600

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Mar. 1985

Program Name: TRANCO

Person to Contact: Eva S. Bozoki
Address: NSLS Dept.
Brookhaven National Laboratory
Upton, NY 11973
USA

Telephone Number: (516) 282-3701

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Transport Lines

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Transport lines

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: Control

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Purpose: To provide a tool to examine and control of transport lines in terms of beam and machine parameters using the mathematical model of the system.

It is a modeling program, which can be used

1) off-line as a design program (like, e.g., TRANSPORT) or

2) on-line as a control program. (When used as a control program, the program-microprocessor interface is specific to the installation.)

The program can perform

1) ellipse matching — calculate/control the orientation and shape of the phase space ellipses,

2) ellipse positioning — calculate/control the position of the center of the phase space ellipses,

3) beam steering.

A colored graphic display program for GENESCO GCT-300 display system is also available.

Lattice data are read from input files. User-program interface is through screen and it is designed in such a way as to facilitate the input and minimize the effort (using data validation and default options).

Publications describing the code:

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

Eva S. Bozoki, "High Level Control Programs at NSLS," Computing in Accelerator Design and Operation (1983) 420.

Source language: FORTRAN

Computers it runs on: DG

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Jan. 1986 Program Name: TRANSOPTR

Person to Contact: Mark S. de Jong
Address: Accel. Phys. Branch
Chalk River Nuclear Laboratories
Chalk River, Ontario KOJ-1-JO
Canada

Telephone Number: (613) 584-3311

Classification of Computer Code:
Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐
Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Beam Transport

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐
Analysis:
☐ Stability, ☐ Impedances, ☐
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A beam transport design code with parametric optimization. The code analyses the transport of charged particle beams through a user defined magnet system. Space charge effects may be included either in two dimensions, treating transverse forces only, or in three dimensions by treating both transverse and longitudinal forces on the beam. The magnet system parameters are varied (within user defined limits) until the properties of the transported beam and/or the system transport matrix match those properties requested by the user. The code uses matrix formalism to represent the transport elements and optimization is achieved using the variable metric method. For problems without space charge a first or second order matrix formalism can be selected. Any constraints that can be expressed algebraically may be included by the user as part of his design.

Publications describing the code:

R. M. Hutcheon and E. A. Heighway, Nuc. Inst. & Mtds. 187 (1981) 89-95.

E. A. Heighway and M. S. de Jong, "A First Order Space Charge Option for TRANSOPTR," IEEE Trans. NS30 (1983) 2666.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

From Mark de Jong, or from Edward A. Heighway, AT-6, MS H820, Los Alamos National Laboratory, Los Alamos, NM 87545 (505) 667 1543, FTS 843 1543.

Source language: FORTRAN 77

Computers it runs on: CDC, CYBER, CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: as desired
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: June 1985

Program Name: TRANSPORT

Person to Contact: David C. Carey
Address: Fermilab
P.O. Box 500
Batavia, IL 60510
USA

Telephone Number: (312) 840 3639, FTS 370 3639

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam Line

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [x] Beam Line

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Beam line transfer matrix calculation and fitting program. Calculates floor coordinates, beam matrix, and first, second and some third-order transfer matrices. Elements included are-bending-magnet, quadrupole, sextupole, octupole, solenoid, and accelerating cavity. Can simulate misalignments, beam steering, and random errors for any beam line parameter. The code will accept input in the MAD format

Publications describing the code:

(TRANSPORT manual) SLAC-91, or NAL-91, or CERN-80.04

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Sue McNamara, Program Librarian,

Fermilab, P.O. Box 500, Batavia, IL 60510.

Source language: FORTRAN

Computers it runs on: CDC, IBM, VAX

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: most anything
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: b00665@final or in Europe try FCPGCERNVM

Date of Latest Version: unknown

Program Name: TRANSPORT, LBL Version

Person to Contact: Arthur C. Paul
Address: MS L-626,
Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, CA 94550
USA
Telephone Number: (415) 423-3183, FTS 543-3183

Classification of Computer Code:

Component Design:

☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Beam lines

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Beam lines

Analysis:

☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRANSPORT is a computer code for calculating properties of charged particle beam transport systems using the matrix method in a six-dimensional phase space and a version of TRANSPORT was translated into FORTRAN from the original BALGOL SLAC TRANSPORT. Some of the important additions are polygon transformation, ray tracing, particle separator, space charge, output plotting, interactive on-line calculations, and flexible data manipulation procedures.

Publications describing the code:

A. C. Paul, "TRANSPORT: An Ion Optic Program. LBL Version," LBL Internal Report 2697 (1975) 6pp.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: unknown

Program Name: TRANSVRS

Person to Contact: Karl Bane
Address: Stanford Linear Accelerator Center
SLAC BIN 26
P.O. Box 4349
Stanford, CA 94305
USA
Telephone Number: (415) 497-2026, FTS 461-9300 ext. 2026

Classification of Computer Code:

Component Design:

☐ Ion Source, ☐ Magnet, ☒ RF-cavity, ☐

Accelerator Optimization:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:

☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:

☒ Stability, ☐ Impedances, ☒ Wakefield Effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRANSVRS is a code to calculate the frequencies of a large number of deflecting modes in a periodic array of rf cavities. Using these frequencies one can calculate the transverse wakefield forces on a bunch beam tending to cause beam breakup.

Publications describing the code:

K. Bane and B. Zotter, "Transverse Modes in Periodic Cyclindrical Cavities," Proc. of 11th Int'l Conf. on High Energy Accelerator, Geneva, Switzerland, July 7-11, 1980, Birkhauser Verlag, Basel (1980).

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

Call Karl Bane.

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks

Tape format:

Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address: KBANE@SLACVM.BITNET

Date of Latest Version: unknown

Program Name: TRIDIF

Person to Contact: John R. Freeman
Address: Org.1241, Bldg.980
Sandia National Laboratory
P.O. Box 5800
Albuquerque, NM 87115
USA
Telephone Number: (505)844-5254, FTS 844-5254

Classification of Computer Code:

Component Design:
☐ Ion Source, ☒ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRIDIF is a time-dependent diffusion version of the well-known PANDIRA-POISSON-TRIM triangular mesh magnet code. Modifications allow TRIDIF to treat field diffusion in materials with time-varying permeabilities. Good agreement between the measured and computed magnetic fields was found for a simple test experiment.

See also documentation on PANDIRA, POISSON and TRIM.

Publications describing the code:

M. L. Hodgdon; J. R. Freeman, "Transient Magnetic-field Calculations with TRIDIF," Sandia National Laboratory Internal Report No. SAND-81-2001C; CONF-810954-1 (1981) 10pp.

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

Contact John Freeman; Hodgdon has left Sandia.

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: 1975

Program Name: TRIM (ANL) & FORGY

Person to Contact: Robert J. Lari 360
Address: Argonne National Laboratory
9700 S. Cass Ave.
Argonne, IL 60439
USA

Telephone Number: (312)972-6632, FTS 972-6632

Classification of Computer Code:

Component Design:
[ ] Ion Source, [x] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[ ] Stability, [ ] Impedances, [ ]

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRIM — 2D magnetostatic code, FORGY — Force calc on coils and steel

Publications describing the code:

Alan M. Winslow, UCRL-7784-T (1965).

R. Lari, TRIM - Unpublished User Guide.

R. Lari, FORGY - ANL Internal Report TKK/RJL-2 (1975).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact Robert Lari.

Source language: FORTRAN

Computers it runs on: IBM 370

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format: LRECL = 80, RECFM = FB, BLKSIZE = 800
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address: None

Date of Latest Version: unknown

Program Name: TRIO

Person to Contact: T. Matsuo
Address: College of General Education
Osaka Univ.,
Toyonaka,
Japan

Telephone Number:

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Beam Lines

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRIO (Third Order Ion Optics) is a computer program for the calculation of ion trajectories; it is applicable to any ion optical system consisting of drift spaces, cylindrical or toroidal electric sector fields, homogeneous or inhomogeneous magnetic sector fields, magnetic and electrostatic Q-lenses. The influence of the fringing field is taken into consideration. The trajectory calculation can execute with accuracy up to third order. Any one of three dispersion bases, momentum, energy, mass and energy, may possibiy be selected.

Publications describing the code:

T. Matsuo; H. Matsuda; Y. Fujita; H. Wollnik "Computer program 'TRIO' for Third Order Calculation of Ion Trajectory," Shitsuryo Bunseki (Japan) v. 24:1 (1976) 19-62. Also available as: Proceedings of the Third Symposium on Ion Sources and Application Technology (1979) 25-28.

H. Wollnik and Matsuo, "Addition of Flight Time Calculation to Computer Program TRIO," Mass Spectroscopy 27 (1979) 131-134.

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?

unknown.

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks

Tape format:

Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☐ BITNET
☐

Network Address:

Date of Latest Version: Apr. 1985 Program Name: TURTLE

Person to Contact: David C. Carey
Address: Fermilab
P.O. Box 500
Batavia, IL 60510
USA

Telephone Number: (312) 840-3639, FTS 370 3639

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☒ Beam Line

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Simulation of single-pass, charged-particle beam lines and spectrometers. Includes geometric terms and all-order chromatic effects for individual quadrupoles, bending magnets, sextupoles, and solenoids. Accumulates effects regardless of order. Can make specified one- and two-dimensional histograms of particle coordinates at any beam line location.

Publications describing the code:

National Accelerator Laboratory internal report 61 (TURTLE manual).

Is code documentation available? ☒ Yes ☐ No

How may the code be obtained?

Sue McNamara, Program Librarian

Fermilab, P.O. Box 500, Batavia, IL 60510

Source language: FORTRAN

Computers it runs on: CDC, IBM, VAX

It is available as: ☒ Source code, ☐ Executable only

Source Media: ☐ Listing, ☒ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format: most anything
Diskette size & format:

Available through: ☐ DECNET, ☐ ARPANET, ☒ BITNET
☐

Network Address: b90665@fnal

Date of Latest Version: Jun. 1985 Program Name: ULTRAFISH

Person to Contact: Los Alamos Accelerator Code Group
Address: MS H-829, Group AT-6
Los Alamos National Laboratory
Los Alamos, NM 87544
USA

Telephone Number: (505) 667-6677 (or 667-2839), FTS 843-6677

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☒ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ULTRAFISH computes the resonant frequencies and fields in an rf cavity which is a figure of revolution for azimuthally assymmetric modes. It will handle regions of different permeability and dielectric constant. It works for some geometries, but not others. The code has essential problems involving boundary conditions that have never been overcome.

Publications describing the code:

R. L. Gluckstern, R. F. Holsinger, K. Halbach and G. N. Minerbo, "ULTRAFISH — Generalisation of SUPERFISH to m ≠ 1," Proc. 1981 Linear Accl. Conf. in Santa Fe, Los Alamos Report LA-9234-C, p. 102.

Is code documentation available? ☐ Yes ☒ No

How may the code be obtained?

It is not available for distribution.

Source language:

Computers it runs on:

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☐ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Jan. 1986 Program Name: URMEL

Person to Contact: Thomas Weiland
Address: Deutches Elektronen Synchrotron/DESY
Notkestrasse 85 d2000
Hamburg 52
Federal Republic of Germany

Telephone Number: 49-40-8998-3196

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [x] RF-cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[x] Stability, [x] Impedances, [x] Wake field effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

URMEL computes symmetric (m=0) and asymmetric (m 0) resonant modes in cavities and frequencies of longitudinally homogeneous fields in waveguides for cylindrically symmetric accelerating structures. It uses a rectangular mesh. Only the electric field components in the (r,s) plane are used for the calculation of the transverse modes instead of H_ϕ & E_ϕ. The discretization is based on FIT (Finite Integration Techniques) described in the reference. Many modes are found on one pass.

Publications describing the code:

T. Weiland, Electronics & Communication (AEÜ) 31 (1977) 116.

T. Weiland, Nucl. Inst. & Meth. 216 (1983) 329.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

One must get the code directly from Thomas Weiland.

Executable form of the code is installed at Los Alamos and Lawrence Livermore National Labratories (For more information on these contact Therese Barts (505) 667 9385 at Los Alamos.)

Source language: FORTRAN 77

Computers it runs on: CRAY, VAX/VMS, IBM 3081

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: as desired
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: mpywei %dhhdesy3.bitnet

Date of Latest Version: Apr. 1986 Program Name: URMEL-T

Person to Contact: Thomas Weiland
Address: Deutsches Elektronen Synchrontron/DESY
Notkestrasse 85 d2000
Hamburg 52
Federal Republic of Germany

Telephone Number: 49-40-8998-3196

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☒ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☒ Stability, ☒ Impedances, ☒ Wake field effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

URMEL-T computes symmetric (m=0) and assymetric (m>0) resonant modes in cavities and frequencies of longitudinally homogeneous fields in waveguides for cylindrically symmetric accelerating structures. It uses a triangular mesh instead of the rectangular mesh used by URMEL.

Publications describing the code:

T. Weiland, Electronics & Communication (AEÜ) 31 (1977) 116.

U. Van Rienen and T. Weiland, "Triangular Discretization Method for the Evaluation of RF-fields in Waveguides and Cylindrically Symmetric Cavities," IEEE Trans. MAG-21 (1985) 2317–20.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

One must get the code directly from Thomas Weiland.

Executable form of the code is installed at Los Alamos and Lawrence Livermore National Laboratories. For more information on these contact Therese Barts (505) 667-9385 at Los Alamos National Laboratory.

Source language: FORTRAN 77

Computers it runs on: CRAY, VAX/VMS, IBM 3081

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: EBCDIC
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[ ]

Network Address: mpywei %dhhdesy3.bitnet

Date of Latest Version: June, 1986 Program Name: WAVE

Person to Contact: David W. Forslund
Address: MS E531, X-DO
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667-4370, FTS 843-4370

Classification of Computer Code:

Component Design:
☐ Ion Source, ☐ Magnet, ☐ RF-cavity, ☐

Accelerator Optimization:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Tracking or Simulation:
☐ Linac, ☐ Cyclotron, ☐ Synchrotron, ☐

Analysis:
☐ Stability, ☐ Impedances, ☐

Other: Laser beat wave accelerators

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

WAVE is a 2D, particle-in-cell code for self-consistently solving Newton's equations of motion and Maxwell's equations. It has application to space charge problems, plasmas and analysis of laser-plasma interactions. It is portable to any installation. Partial documentation exists.

Publications describing the code:

D. W. Forslund, "Fundamentals of Plasma Simulation," Space Science Reviews 42 (1985) 3–16.

R. L. Morse and C. W. Nielson, "Numerical Simulation of the Weibel Instability in One and Two Dimensions," Phys. Fluids 14 (1971) 830.

C. Joshi et al, "Ultrahigh Gradient Particle Acceleration by Intense Laser-driven Plasma Density Waves," Nature 311 (1984) 525.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Call David Forslund.

Source language: FORTRAN 77

Computers it runs on: PC's, VAX, CRAY, IBM

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format: as desired
Diskette size & format:

Available through: [ ] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: dwf@lanl.arpa

Date of Latest Version: 1985 Program Name: WOLF

Person to Contact: K. Halbach
Address: Lawrence Berekeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720
USA

Telephone Number: (415) 486-5868, FTS 451-5868

Classification of Computer Code:

Component Design:
[x] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The WOLF code solves POISSON's equation within a user-defined problem boundary of arbitrary shape. The code is compatible with ANSI FORTRAN and uses a two-dimensional Cartesian coordinate geometry represented on a triangular lattice. The vacuum electric fields and equipotential lines are calculated for the input problem. The user may then introduce a series of emitters from which particles of different charge-to-mass ratios and initial energies can originate. These non-relativistic particles will then be traced by WOLF through the user-defined region. Effects of ion and electron space charge are included in the calculation. A subprogram PISA forms part of this code and enables optimisation of various aspects of the problem. The WOLF package also allows detailed graphics analysis of the computed results to be performed.

Publications describing the code:

K. Halbach, "Mathematical Models and Algorithms for the Computer Program WOLF," Lawrence Berkeley Laboratory Internal Report no. LBL-4444 (1979).

D. L. Vogel, "WOLF: A Computer Code Package for the Calculation of Ion Beam Trajectories," LBL Internal Report no. LBL 18871 (1985).

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Ludmilla Soraka, LBL, (415) 486 5011

Source language: FORTRAN

Computers it runs on: VAX, CDC

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

Date of Latest Version: Dec. 1986 Program Name: WIGWAM

Person to Contact: John M. Jowett
Address: LEP Division
CERN
CH 1211 Geneva 23
Switzerland

Telephone Number: (022) 83 66 43 or 83 50 86

Classification of Computer Code:
Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]
Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [x] Synchrotron, [ ]
Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]
Analysis:
[ ] Stability, [ ] Impedances, [ ]
Other: Electron storage ring performance, wigglers

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

WIGWAM evaluates the parameters and performance of electron-positron storage rings in a very flexible way. It includes the effects and will calculate the excitations for normal dipole wigglers and nonlinear wigglers (combined function quadrupole-sextupole or dipole-octupole) using appropriate generalizations of the usual electron ring formulae. The program will also optimize performance (e.g. maximise luminosity, minimise energy spread, etc.) by calculating appropriate schemes for varying damping partition numbers, coupling, wiggler fields, RF voltage, etc. It also produces the "loofa" diagrams, which provide a global picture of the potential performance of a ring.

Although the program is still under development with a view to integration into the MAD environment, a working version is available.

Publications describing the code:

J. M. Jowett,"Luminosity and Energy Spread in LEP," CERN LEP TH/85-4 gives many examples of output.

J. M. Jowett, "Description of the WIGWAM Program," CERN internal report LEP Note 521.

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

Contact J. M. Jowett.

Source language: FORTRAN

Computers it runs on: IBM

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [x] Networks
Tape format:
Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [x] BITNET
[x] EARNET

Network Address: JOWETT@CERNVM

Date of Latest Version: June 1986 Program Name: ZAP

Person to Contact: Michael S. Zisman
Address: Mail Stop 47/112
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

Telephone Number: (415) 486-5765, FTS 451-5765

Classification of Computer Code:

Component Design:
[ ] Ion Source, [ ] Magnet, [ ] RF-cavity, [ ]

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
[x] Stability, [ ] Impedances, [x] Intra-Beam Scattering (IBS) effects;
Lifetimes (Touschek, gas scattering)

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ZAP can be used to calculate single bunch instability thresholds and instability growth rates from coupled bunch instabilities in storage rings, bunch lengthening, Touschek and gas scattering lifetimes, equilibrium emittances for electron beams in the presence of radiation damping, quantum fluctuations, and intrabeam scattering. It is an interactive, self-prompting code.

Publications describing the code:

Lawrence Berkely National Laboratory Report no. LBL 21270

Is code documentation available? [x] Yes [ ] No

How may the code be obtained?

From Michael S. Zisman.

Source language: FORTRAN 77

Computers it runs on: VAX, Ridge

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [x] Diskette, [ ] Cart's, [x] Networks
Tape format:
Diskette size & format: RX50

Available through: [x] DECNET, [x] ARPANET, [x] BITNET
[ ]

Network Address: ESGVAX::zisman (node 41.190)

zisman@lbl.arpa

zisman@lbl.bitnet

Date of Latest Version: unknown

Program Name: ZFIELD

Person to Contact: Curry Sawyer
Address: E.G. & G. Energy Measurements, Inc.
Santa Barbara Operations
Goleta, CA 93117
USA

Telephone Number:

Classification of Computer Code:

Component Design:

[ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:

[ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:

[x] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:

[ ] Stability, [ ] Impedances, [x] Space Charge

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ZFIELD, a trajectory computer code for a linac beam, has been written as a design aid to complement the TRANSPORT code. It includes space charge, plots the emittance ellipse at axial values, and plots beam radius. Comparing ZFIELD and TRANSPORT in drift regions, significant differences in beam radius predictions are found in the 2-Mev-region for currents above 200 A and above 400 A in the 4-Mev-region. Using ZFIELD, beam envelope growth for beams with different emittance can be compared, and the effect of space charge on emittance growth can be shown graphically.

Publications describing the code:

C. Sawyer and N. Norris, "Estimation of Space Charge and Emittance Growth Effects in a Drift Region," Proceedings of the 1984 Linear Accelerator Conference, Darmstadt-Seeheim, report no. GSI-84-11, pp.349-51.

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

unknown

Source language:

Computers it runs on:

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format:

Diskette size & format:

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET
[ ]

Network Address:

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